NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

A REASSESSMENT OF ARMY PROGRAM MANAGER COMPETENCIES

by

Scott C. Armstrong

March 1999

Principal Advisor:	Lee Edwards
Associate Advisor:	Michael W. Boudreau

Approved for public release; distribution is unlimited.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	March 1999	Master's Thesis

4. TITLE AND SUBTITLE A REASSESSMENT OF ARMY PROGRAM MANAGER COMPETENCIES

5. FUNDING NUMBERS

6. AUTHOR(S) Armstong, Scott C.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

ABSTRACT ***(Maximum 200 words)***

This thesis sought to identify those personal characteristics (competencies), which are most critical for Army Program Managers (PMs) to be successful in today's DOD acquisition environment. Follow-on research to DSMC and NPS PM job competency studies was conducted. A similar research methodology was used to analyze the same 27 competencies. A Revised PM Competency Model was developed from the survey data obtained from 39 "outstanding" Army PMs. The model contains 16 competencies, including nine identified as "most important" for PMs to possess. The three most important competencies were "Long Term Perspective," "Innovativeness," and "Political Awareness." "Professional Expertise," "Strategic Influence," and "Innovativeness" have all become significantly more important over the last decade. "Political Awareness" and "Strategic Influence" were identified as areas needing additional development. Finally, the PMs ability to manage their "external environment" effectively continues to be vital to their success.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Competencies, Program Management, Acquisition Reform, Program Manager	153
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18 298-102

#13 Abstract (Continued)

Based on these findings, the following recommendations are presented: DAU schools should reassess curriculums to ensure critical competencies are being adequately addressed; a 4-6 week DOD PM Internship Program should be incorporated into the graduate level program management curriculums at DAU schools. Implementation of these recommendations would enhance the DOD acquisition workforce through competency development of future PMs.

This thesis research provides the Acquisition Corps and future PMs with current insight into the competencies required for successful program management in DOD.

Approved for public release; distribution is unlimited.

A REASSESSMENT OF ARMY PROGRAM MANAGER COMPETENCIES

Scott C. Armstrong
Captain, United States Army
B.S., Colorado State University, 1989

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
March 1999

Author: _____
Scott C. Armstrong

Approved by: _____
Lee Edwards, Principal Advisor

_____
Michael W. Boudreau, Associate Advisor

_____
Reuben T. Harris, Chairman,
Department of Systems Management

ABSTRACT

This thesis sought to identify those personal characteristics (competencies), which are most critical for Army Program Managers (PMs) to be successful in today's DOD acquisition environment. Follow-on research to DSMC and NPS PM job competency studies was conducted. A similar research methodology was used to analyze the same 27 competencies. A Revised PM Competency Model was developed from the survey data obtained from 39 "outstanding" Army PMs. The model contains 16 competencies, including nine identified as "most important" for PMs to possess. The three most important competencies were "Long Term Perspective," "Innovativeness," and "Political Awareness." "Professional Expertise," "Strategic Influence," and "Innovativeness" have all become significantly more important over the last decade. "Political Awareness" and "Strategic Influence" were identified as areas needing additional development. Finally, the PM's ability to manage their "external environment" effectively continues to be vital to their success.

Based on these findings, the following recommendations are presented: DAU schools should reassess curriculums to ensure critical competencies are being adequately addressed; a 4-6 week DOD PM Internship Program should be incorporated into the graduate level program management curriculums at DAU schools. Implementation of these recommendations would enhance the DOD acquisition workforce through competency development of future PMs.

This thesis research provides the Acquisition Corps and future PMs with current insight into the competencies required for successful program management in DOD.

TABLE OF CONTENTS

I. INTRODUCTION 1

A. AREA OF RESEARCH 1

B. THESIS OBJECTIVES 5

C. RESEARCH QUESTIONS 5

1. Primary Research Question 5

2. Secondary Research Questions 5

D. SCOPE OF THESIS 6

E. ORGANIZATION OF RESEARCH 6

F. CHAPTER SUMMARY 7

II. BACKGROUND 9

A. OVERVIEW 9

B. PREVIOUS PROGRAM MANAGER COMPETENCY RESEARCH 9

1. DSMC Study: A Competency Model of Program Managers in the DOD Acquisition Process, 1990 10

2. NPS Thesis: Army Program Managers, A Competency Perspective, 1994 19

C. RECENT CHANGES IN THE DOD ACQUISITION ENVIRONMENT 22

1. Defense Acquisition Workforce Improvement Act (DAWIA), 1990 22

2. Federal Acquisition Streamlining Act (FASA), 1994 23

3. Federal Acquisition Reform Act (FARA), 1996 24

4. Department of Defense 5000 Series Update 25

D. CHAPTER SUMMARY 27

III. METHODOLOGY 29

A. OVERVIEW 29

B. WHICH PROGRAM MANAGER COMPETENCIES SHOULD BE QUESTIONED? 29

C. IDENTIFY "OUTSTANDING" PROGRAM MANAGERS AS RESEARCH PARTICIPANTS 30

D. COLLECTION OF DATA 32

E. DETERMINE THE RELATIVE IMPORTANCE OF COMPETENCIES 34

F. IDENTIFY THOSE COMPETENCIES WHICH NEED DEVELOPMENT 34

G. COMPARISON OF RESULTS WITH PREVIOUS STUDIES 35

H. CHAPTER SUMMARY 35

IV. ANALYSIS AND DISCUSSION 37

A. OVERVIEW 37

B. SURVEY SAMPLE AND DEMOGRAPHICS 37

1. Survey Sample 37

2. Survey Demographics 37

C. COMPETENCY SURVEY FINDINGS 38

1. Competency Importance Analysis 38

2. Development Area Analysis 46

D. REVISED PROGRAM MANAGER JOB COMPETENCY MODEL 48

E. ANALYSIS OF PROGRAM MANAGER JOB COMPETENCIES 50

1. "Most Important" Competencies 51

2. "Average Importance" Competencies 62

F. COMPARISON OF FINDINGS TO PREVIOUS STUDIES 69

1. Comparison of Job Competency Models 69

2. Competency Importance Comparison 74

3. Comparison of Competencies Needing Development 81

G. CHAPTER SUMMARY 86

V. CONCLUSIONS AND RECOMMENDATIONS 89

A. OVERVIEW 89

B. CONCLUSIONS 90

1. General Conclusions 90

2. Specific Conclusions 90

C. RECOMMENDATIONS 96

1. Reassessment of Existing DAU School Curriculums 96

2. DOD Program Manager Internship Program 97

3. Acquisition Community Awareness 98

D. LIMITATIONS OF THIS RESEARCH 98

E. AREAS FOR FURTHER RESEARCH 99

APPENDIX A. NPS-94 COMPETENCY SURVEY RESULTS 101

APPENDIX B. DEPARTMENT OF THE ARMY PROGRAM MANAGER OF THE YEAR AWARD NOMINATION FORMAT 103

APPENDIX C. PROGRAM MANAGEMENT CHARACTERISTICS SURVEY 105

APPENDIX D. INITIAL PROGRAM MANAGER CONTACT E-MAIL 115

APPENDIX E. PROGRAM MANAGER INSTRUCTIONAL E-MAIL 117

APPENDIX F. COMPETENCY CONFIDENCE INTERVAL CALCULATIONS 119

APPENDIX G. COMPETENCY MEAN TREND ANALYSIS 121

APPENDIX H. COMPETENCY DEVELOPMENT AREA TREND ANALYSIS 125

LIST OF REFERENCES 127

BIBLIOGRAPHY 129

INITIAL DISTRIBUTION LIST 131

LIST OF FIGURES

Figure 1. Impact of Time on Ability to Affect Life-Cycle –Cost (DSMC, PMT 302 Course, 1998) 25

Figure 2. Program Manager Competencies Sample Mean of PM Competencies 40

Figure 3. Competency Confidence Intervals 44

Figure 4. Competency Development Interval Scale 49

Figure 5. Competencies of Increasing Relative Importance 76

Figure 6. Competencies of Decreasing Relative Importance 79

Figure 7. Competencies of Relatively Stable Importance 80

Figure 8. Competency Development Areas 85

Figure 9. Program Manager Competencies Mean Interval Scale 91

Figure 10. Competency Development Areas 93

Figure 11. Most Important PM Competencies & Competencies of Increasing Relative Importance 94

LIST OF TABLES

Table 1. Final DSMC, DOD Program Manager Competency Model, 1990 2

Table 2. Final NPS Program Manager Competency Model, 1994 3

Table 3. DOD Program Manager Characteristics Studies 10

Table 4. DSMC Interview Demographics 12

Table 5. DSMC Hypothesized Program Manager Competency Model, 1990 12

Table 6. DSMC Competency Interview Data Analysis 13

Table 7. Final DSMC, DOD Program Manager Competency Model, 1990 15

Table 8. DSMC Survey Analysis (Competency Importance) 17

Table 9. DSMC Survey Analysis (Areas Needing Training) 18

Table 10. Final NPS Program Manager Competency Model, 1994 21

Table 11. Acquisition Reform Themes and Enablers 26

Table 12. Competency Survey Demographics (n=39) 38

Table 13. Competency Importance Data Analysis 39

Table 14. NPS-99 Competency Development Areas 46

Table 15. Revised Program Manager Job Competency Model 48

Table 16. Competency Analysis Historical Comparison 70

Table 17. Job Competency Model Comparison 72

Table 18. Competency Developmental Needs Comparison 83

Table 19. Revised Program Manager Job Competency Model 95

LIST OF ABBREVIATIONS

PROGRAM MANAGER COMPETENCY

Action:	Action Oriented
Assert:	Assertiveness
Attent:	Attention to Detail
Coaches:	Coaches Others
Collab:	Collaborative Influence
Compet:	Competitiveness
Creat:	Creativity
Crit:	Critical Inquiry
Direct:	Directive Influence
Effic:	Efficiency Orientation
Focus:	Focus on Excellence
Innov:	Innovativeness
Int Ass:	Interpersonal Assessment
Int Sen:	Interpersonal Sensitivity
Long:	Long Term Perspective
Manag:	Managerial Orientation
Optim:	Optimizing
Politic:	Political Awareness
Posit:	Positive Expectations
Proact:	Proactive Information Gathering
Profes:	Professional Expertise
Relat:	Relationship Development
Result:	Results Oriented
Self-C:	Self-Control
Sense:	Sense of Ownership/Mission
Strat:	Strategic Influence
Syst:	Systematic Thinking

LIST OF ACRONYMS

ACAT	Acquisition Category (I (C/D), II, III, IV)
AFIT	Air Force Institute of Technology
APMC	Advance Program Management Course
CAIV	Cost as an Independent Variable
CE	Concept Exploration (Phase)
DACM	Director, Acquisition Career Management
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act
DBOK	Defense Body of Knowledge
DOD	Department of Defense
DSA	Deputy for Systems Acquisition
DSMC	Defense Systems Management College
EC/EKI	Electronic Commerce/Electronic Data Interchange
EMD	Engineering and Manufacturing Development (Phase)
FASA	Federal Acquisition Streamlining Act
FARA	Federal Acquisition Reform Act
FACNET	Federal Acquisition Computer Network
FY	Fiscal Year
HASC	House Armed Services Committee
IPPD/IPT	Integrated Process and Product Development/Integrated Product Team
IT	Information Technology
MoD/PE	Ministry of Defence Procurement Executive , UK
MDA	Milestone Decision Authority
NPS	Naval Postgraduate School
OSD	Office of the Secretary of Defense
PCC	Pre-command Course
PDRR	Program Definition and Risk Reduction
PEO	Program Executive Officer
PFDOS	Production, Fielding/Deployment, and Operational Support (Phase)
PM	Program Manager/Project Manager/Product Manager
PMC	Program Management Course, DSMC
SAP	Simplified Acquisition Procedures
SAT	Simplified Acquisition Threshold
SARDA	Secretary of the Army (Research, Development, and Acquisition)

TOC	Total Ownership Cost
UK	United Kingdom
VTC	Video-Teleconference

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to the 39 Program Managers, both active duty and retired, who took valuable time out of their hectic schedules to complete the Program Manager Job Competency Survey. Their responses and insightful feedback were invaluable to the success of this research. I would also like to thank Professor Lee Edwards, COL (Ret) Mike Boudreau, and Professor Owen Gadeken for their guidance and professional support throughout the thesis process. Finally, I lovingly thank my wonderful wife, Donna, and my son, Taylor, for their love, patience, and encouragement during this brief "stop" along the "pathway of our lives which we travel together" with Christ.

I. INTRODUCTION

A. AREA OF RESEARCH

Program management in today's highly dynamic, complex, demanding, and competitive DOD acquisition environment is extremely challenging. Program managers must be equipped with many unique technical project management "tools" and skills to successfully manage the acquisition of a weapon system. However, a program manager's success is also a function of his leadership capability and character traits since their primary role is to provide leadership focus for their program. (Gadeken, 1997) This research sought to identify those characteristics which are most critical for current program managers to possess to be successful.

In 1987, Defense Systems Management College (DSMC), initiated research in this area seeking "to identify those characteristics which distinguish outstanding program managers." (Cullen and Gadeken, 1990) The study was based on the premise that "the best way to find out what it takes to be a good program manager is to analyze the jobs of outstanding performers and identify what they do that makes them so effective." The study defined a competency as any attribute of a program manager that underlies effective performance. It used a job competency model to identify and evaluate program manager characteristics, defining a competency model as:

> A systematic listing of personal characteristics associated with superior performance in a particular job. These personal characteristics or competencies can be any skill, behavior, knowledge, motive, or trait that is demonstrated more frequently...by superior performers than by average performers and is causally related to effective performance in a variety of job tasks. (Cullen and Gadeken, 1990)

To develop the competency model, DSMC used a process which included convening advisory panels, program manager interviews, and program manager surveys. The final DSMC Program Manager Competency Model identified ten competencies which both "effective" and "outstanding" program managers indicated were important for program managers. Additionally, it identified six competencies which distinguished outstanding program managers from effective ones, as indicated below by a "*" in Table 1. (Cullen and Gadeken, 1990)

Table 1. Final DSMC, DOD Program Manager Competency Model, 1990

Managing the External Environment	***Managing for Enhanced Performance***
1. Sense of Ownership/Mission * 2. Political Awareness * 3. Relationship Development * 4. Strategic Influence * 5. Interpersonal Assessment * 6. Assertiveness	10. Long-Term Perspective 11. Focus on Excellence 12. Innovativeness/Initiative 13. Optimizing 14. Systematic Thinking
Managing the Internal Environment	***Proactivity***
7. Managerial Orientation 8. Results Orientation 9. Critical Inquiry	15. Action Orientation * 16. Proactive Information Gathering

Source: Cullen and Gadeken, 1990, pp. 2-17.

The methodology and results of the DSMC program manager competency study are further discussed in Chapter II, Background.

In 1993-1994, the Naval Postgraduate School (NPS) conducted follow-on research to the DSMC program manager competency study, focusing specifically on Army Acquisition Category (ACAT)-I(C/D) program managers. These are considered major defense acquisition programs, meeting funding level criteria established by DOD. The researcher used the DSMC Competency Model and a similar research methodology

to identify and analyze the personal characteristics that distinguish the Army's best ACAT-I(C/D) program managers. His research determined that 14 of the 16 program manager competencies identified in the DSMC Job Competency Model are valid for Army ACAT-I program managers. Eleven of these 14 competencies were identified as the "most important" or "important" competencies for the "ideal" program manager and were named "core" competencies. The remaining three were identified as competencies which distinguish *outstanding* program managers, as identified by "*" in Table 2. Finally, two additional competencies, used in the DSMC study as control competencies, were also rated as being "most important" by successful program managers and also are distinguishing competencies of *outstanding* program managers, identified by "**" in Table 2.

Table 2. Final NPS Program Manager Competency Model, 1994

Managing the External Environment	***Managing for Enhanced Performance***
1. Sense of Ownership/Mission 2. Political Awareness 3. Relationship Development * 4. Strategic Influence 5. Interpersonal Assessment *	9. Long-Term Perspective 10. Focus on Excellence 11. Innovativeness / Initiative 12. Systematic Thinking 13. Self Control** 14. Coaches Others**
Managing the Internal Environment	***Proactivity***
6. Managerial Orientation 7. Results Oriented* 8. Critical Inquiry	15. Action Oriented 16. Proactive Information Gathering

Source: McVeigh, 1994.

The methodology and results of the NPS program manager competency study are further discussed in Chapter II, Background. This study will refer to the 1994 NPS Program Manager Competency Study as "NPS-94."

In general, the results of the DSMC and NPS studies were similar. Many of the same competencies were identified as critical for successful program managers. However, many significant changes have occurred to the acquisition environment since these studies were conducted, starting with the Congressional passage of the Defense Acquisition Workforce Improvement Act (DAWIA) in 1990. Since that time, much legislation has been passed and many acquisition reform initiatives introduced in an effort to make the DOD acquisition process more efficient. These changes have radically changed the way DOD program managers manage their programs. Additionally, since the end of the Cold War, procurement budgets have continued to fall, resulting in dramatic "belt-tightening" within DOD. This has required program managers to manage their programs under resource constrained conditions.

Although these changes in the acquisition environment do not invalidate the previous studies, the Program Manager Competency Model must be periodically reassessed to determine if the competencies required to be a successful program manager in DOD have changed as a result of the changing environment. By comparing data collected in this study with the results of the previous two studies, changes in key competencies are identified.

For clarification and common understanding, this research uses the terms as listed below:

- "Competency" (as defined in the original DSMC study): "any attribute (or trait) of a person that underlies effective performance; a job competency is simply an attribute related to doing a job effectively" (Klemp, 1979).
- The term "competency" is synonymous with the term "characteristic."
- "Outstanding" is defined as "superior to others of its kind (program managers); distinguished, excellent." (American Heritage Dictionary, 1982)
- In this study, "Program manager" collectively includes project, product, and program managers.

B. THESIS OBJECTIVES

The purpose of this follow-on research is to identify the competencies most needed by outstanding Army Program Managers in the current acquisition environment. It will also determine whether the competencies required today differ from those identified during two previous research efforts. The objective is to develop an updated Program Manager Competency Model, using the DSMC, DOD Program Manager Competency Model, as a baseline. This research will then provide the Acquisition Corps and future program managers with current insight into the competencies required for successful program management in the acquisition process.

C. RESEARCH QUESTIONS

1. Primary Research Question

What competencies are most critical to be an outstanding Army Program Manager?

2. Secondary Research Questions

- What program manager competencies need additional development through education and training programs?

- Have the competencies required for an outstanding Army program manager changed over the past decade?

- To what extent are the DSMC and NPS-94 Program Manager Competency Models valid for *current* Army program managers?

D. SCOPE OF THESIS

Army program managers are responsible for the successful acquisition of all types of equipment, from the Abrams main battle tank to the bayonet. These program managers are trained and educated by the Army throughout their career to improve their acquisition management abilities. The DSMC job competency model is one tool DOD has used to tailor its program manager training and education programs. Therefore, the Army should first ensure that the model is truly representative of the competencies needed today to be a successful Army program manager.

The DSMC study found that there was no significant difference in the key competencies used by major program managers and non-major program managers or across Service boundaries (Army, Navy, and Air Force). This thesis research reassesses the DSMC model from the perspective of Army program managers, regardless of program size (ACAT ID through ACAT IV) or type, to determine if Army program managers do, in fact, need the same competencies to be successful today.

E. ORGANIZATION OF RESEARCH

This thesis is organized into five chapters. Chapter I provides a brief introduction to the topic of research, identifies the research questions of this thesis, defines its scope, describes its organization. Chapter II introduces the 1990 DSMC Model and follow-on thesis research conducted at the Naval Postgraduate School, upon which this study is

based. It concludes with a discussion of recent changes that have occurred to the DOD acquisition environment that directly impact program managers.

Chapter III describes the methodology used in this research to reassess the DSMC Program Manager Competency Model. It describes the assessment tool development, how the sample population was determined, and how the data were analyzed to provide useful information. Chapter IV is an analysis of the statistical results of this study. It identifies critical competencies for *today's* program managers, proposes an updated Program Manager Job Competency Model, analyzes each competency in the model, and identifies competencies that program managers believe are in need of further development. Additionally, it systematically compares these results to the findings of the DSMC and NPS studies, identifying competency changes/trends over time. Chapter V is a summary of all the information presented. Based on the analysis presented in Chapter IV, it draws conclusions and makes recommendations that can be instituted and utilized by today's acquisition workforce.

F. CHAPTER SUMMARY

This chapter has provided a brief introduction to the topic of research and identified the primary and secondary research questions. It also identified the scope of the research effort and detailed the organization of the thesis.

II. BACKGROUND

A. OVERVIEW

This chapter first provides a brief summary of research efforts conducted previously in the area of DOD program manager competencies. It then reviews the objectives, methodologies, and findings of the two competency studies that are most relevant to this research effort. Finally, the principal legislative changes in the DOD acquisition environment over the previous decade are discussed, including acquisition reform.

B. PREVIOUS PROGRAM MANAGER COMPETENCY RESEARCH

Since program management emerged as a credible approach to managing complex weapon system acquisitions within DOD, each of the defense acquisition schools have conducted research regarding the specific skills and characteristics required of program managers. (See Table 3) The Defense Systems Management College conducted its initial research on DOD program manager competencies in the late 1980's, publishing the results in 1990. These results assisted DSMC in reviewing the Program Manager Course (PMC) curriculum and other program manager training. In 1991, DSMC conducted similar research regarding the competencies of project managers in the United Kingdom (UK) Ministry of Defense Procurement Executive (MoD/PE). It compared the UK program manager competencies and skills to the U.S. program manager's competencies identified in the 1990 DSMC study. (Gadeken, 1991) Also in 1991, the Air Force Institute of Technology (AFIT) completed research developing a Defense Body of Knowledge (DBOK) for the field of acquisition program management in DOD. The

relative importance of program manager competencies was one of many areas analyzed. (Best and Kobylarz, 1991) Finally, in 1994, NPS conducted follow-on research to the original DSMC study, resulting in a proposed updated Program Manager Competency Model. Only the original DSMC study and the NPS study will be reviewed in the following section since this study is a follow-on to those studies, having a similar purpose and using a similar research methodology.

Table 3. DOD Program Manager Characteristics Studies

Year	Researcher	Target Population	Project Size	# PMs Interviewed	# PMs Surveyed
1990	DSMC	U.S. – All Services	All	50	128
1991	DSMC	UK – All Services	Major	15	111
1991	AFIT	U.S. - All Services	ACAT I(C/D)	-	53
1994	NPS	U.S. Army	ACAT I(C/D)	7	25*

* 11 "successful" and 14 "average" program managers
Source: Gadeken, 1997.

1. DSMC Study: A Competency Model of Program Managers in the DOD Acquisition Process, 1990

In 1987, Dr. Owen C. Gadeken, then the Director of Educational Research, DSMC, initiated research regarding program manager competencies. Working with Charles River Consulting, Boston, MA, he sought "to identify those characteristics which distinguish outstanding acquisition program managers." (Cullen and Gadeken, 1990) In February, 1990, the research results were published in a DSMC report entitled, A Competency Model of Program Managers in the DOD Acquisition Process. The study was based on the premise that, by analyzing the jobs of outstanding program managers, one could identify what characteristics or behaviors make them effective. This information could then be used to assist in the professional development of aspiring program managers. The study used a job competency model to identify and evaluate personal

characteristics associated with superior performance as a DOD program manager. Generally, a job competency model contains the following three components:

- The competencies that are critical for outstanding performance.
- The definitions of those competencies in terms of observable behavior.
- The relationships among those competencies and the major tasks and activities that make up the job. (Cullen and Gadeken, 1990)

To develop the DOD program manager competency model, DSMC used a five step process. First, a "Management Resource Panel" was convened. It was comprised of senior DOD acquisition professionals, all of whom had extensive program management experience. They identified tasks, personal capabilities, and characteristics that are critical to outstanding program managers, providing DSMC with general insight into the program manager's job. (Cullen and Gadeken, 1990)

Next, two groups of program managers were identified for interviews: "Outstanding" program managers, and a group of effective, more "typical" performers, called "Average" program managers. (Table 4). These participants were identified as being "Outstanding" or "Average" through the use of combined nomination/survey method. Nominations for participation and identification as outstanding or average were made by the Program Executive Officer (PEO) level for the Air Force and Army. For the Navy, a "Peer/Subordinate Evaluation Survey" was used to identify program managers for participation and as outstanding or average. (Cullen and Gadeken, 1990)

Third, each of the selected program managers, n=60, were interviewed for two to three hours. The interviews were conducted using the Critical Behavior Interview technique, a variation of the classic critical-incident interview technique originally developed by John Flanagan in 1954. During the interview, they were asked to describe,

in detail, previous situations in which they had felt either effective or ineffective as a program manager. Additionally, they were asked to describe what they were thinking during the situation and what actions they took. Data obtained from 50 of the 60 interviews conducted were included in the competency model analysis. (Cullen and Gadeken, 1990)

Table 4. DSMC Interview Demographics

	Outstanding PM's	Average PM's	Total PM's
Air Force	7	9	16
Army	4	11	15
Navy	11	8	19
Total	22	28	50*

*10 of the 60 interviews conducted did not provide suitable data for analysis.
Source: Cullen and Gadeken, 1990.

Fourth, six researchers analyzed a subset of the interview transcripts to identify 18 competencies that the program managers had used when managing their programs. From this initial analysis the following Hypothesized Program Manager Competency Model (See Table 5) was developed:

Table 5. DSMC Hypothesized Program Manager Competency Model, 1990

Leadership	***Problem Solving***
1. Sense of Ownership / Mission 2. Long-term Perspective 3. Assertiveness 4. Managerial Orientation	10. Proactive Information Gathering 11. Critical Inquiry 12. Systematic Thinking 13. Interpersonal Assessment
Achievement	***Influence***
5. Focus on Excellence 6. Results Orientated 7. Innovativeness/Initiative 8. Action Orientation 9. Optimizing	14. Political Awareness 15. Building Relationships 16. Strategic Influence 17. Collaborative Influence 18. Directive Influence

Source: Cullen and Gadeken, 1990.

All the interview transcripts were then scored based on the actual number of times each of these 18 competencies were mentioned during the program manager's decriptions of job situations. To analyze the results of the interview transcript scoring, DSMC used a one tailed t-test, based on the assumption that the mean scores for the outstanding program managers would be greater than the scores for average program managers. (Cullen and Gadeken, 1990) The resulting data analysis is shown in Table 6.

Table 6. DSMC Competency Interview Data Analysis

Competency	Outstanding PMs (n+22)			Average PMs (n=28)			t	P
	Mean*	Std Dev	Rank Order by Mean	Mean*	Std Dev	Rank Order By Mean		
Political Awareness	6.4	4.0	1	3,7	3.3	1	2.6	.01
Strategic Influence	5.1	2.9	2	2.6	1.9	6	3.4	.001
Sense of Ownership/ Mission	4.6	3.2	3	3.0	2.5	4	2.0	.03
Results Orientation	4.3	3.5	4	3.2	2.9	2	1.2	NS**
Interpersonal Assessment	4.1	3.7	5	2.0	2.3	9	2.3	.01
Critical Inquiry	4.1	3.0	5	3.0	2.6	5	1.4	.08
Action Orientation	3.7	2.0	7	1.7	1.9	12	3.5	.001
Relationship Development	3.6	3.0	8	1.5	1.4	13	3.0	.003
Proactive Info Gathering	3.6	2.8	8	3.0	2.2	2	.83	NS
Managerial Orientation	2.8	1.7	10	2.2	2.1	7	1.2	NS
Long-term Perspective	2.6	2.5	11	1.8	1.8	10	1.3	.09
Assertiveness	2.0	1.9	12	1.4	1.4	14	1.3	.09
Optimizing	1.9	2.1	13	2.1	1.9	8	(.29)	NS
Systematic Thinking	1.7	0.9	14	1.7	1.3	11	.11	NS
Innovativeness/ Initiative	1.6	3.0	15	0.06	0.8	18	1.3	.09

Table 6 (Continued)

Competency	Outstanding PMs (n+22)			Average PMs (n=28)			t	P
	Mean*	Std Dev	Rank Order by Mean	Mean*	Std Dev	Rank Order by Mean		
Directive Influence	1.5	1.2	16	1.4	1.8	15	.2	NS
Focus on Excellence	1.2	1.8	17	0.6	0.8	17	1.3	.09
Collaborative Influence	1.1	1.1	18	1.1	1.3	16	(.14)	NS

* Mean refers to the average number of times the attribute was scored in an interview. The size of this number does not indicate its relative importance. Identical numbers denote tie scores.

** NS = not significant

Source: Cullen and Gadeken, 1990.

From this analysis DSMC determined that 16 of the originally hypothesized 18 characteristics contribute to effective program manager performance. The other two, Collaborative Influence and Directive Influence, based on their relatively low overall frequency scores, were determined to be of marginal significance to effective program managers. Additionally, DSMC found that the following six competencies were demonstrated significantly more frequently by outstanding program managers than by the average ones: Sense of Ownership/Mission, Political Awareness, Relationship Development, Strategic Influence, Interpersonal Assessment, Action Orientation. They are indicated by "*" in Table 7.

Additional analysis of the data, using factor analysis, revealed that the competencies tended to be clustered in the following major program manager task domains: Managing the External Environment, Managing the Internal Environment, Managing for Enhanced Performance, and Proactivity. These task domains superseded the original categories identified in the hypothesized program manager competency

model. These competencies and task domains became the final DSMC Program Manager Competency Model shown below. (Cullen and Gadeken, 1990)

Table 7. Final DSMC, DOD Program Manager Competency Model, 1990

Managing the External Environment	***Managing for Enhanced Performance***
1. Sense of Ownership/Mission * 2. Political Awareness * 3. Relationship Development * 4. Strategic Influence * 5. Interpersonal Assessment * 6. Assertiveness	10. Long-Term Perspective 11. Optimizing 12. Innovativeness/Initiative 13. Systematic Thinking 14. Focus on Excellence
Managing the Internal Environment	***Proactivity***
7. Managerial Orientation 8. Results Orientation 9. Critical Inquiry	15. Action Orientation * 16. Proactive Information Gathering

* Competencies which distinguished outstanding program managers from average program managers.

Source: Cullen and Gadeken, 1990.

Finally, since the interview sample was relatively small (50 program managers / deputy program managers), DSMC validated its competency model for the general population of program managers by surveying a much larger population of program managers, including:

- The same 50 program managers/deputy program managers which had participated in the critical incident interviews.
- 78 additional program managers.

The survey was also administered to 225 other acquisition professionals (non-program manager positions) so the researcher could conduct a comparative analysis of

competencies required for program managers versus other acquisition professionals. This portion of the DSMC study is not germane to this research and is not discussed further.

The survey included the original 18 hypothesized competencies as well as an additional nine "control" competencies: Attention to Detail, Coaches Others, Creativity, Competitiveness, Efficiency Orientation, Interpersonal Sensitivity, Positive Expectations, Professsionalism, Self Control. The control competencies were drawn from competency studies conducted for other positions. This allowed the researcher to determine whether the 18 hypothesized competencies are in fact more important to DOD program managers than the control competencies. The survey required the participants to select 12 of the competencies that they believed were the most important for a program manager's job, and their own if they were not a program manager. Additionally, they were asked to identify any competencies in which they personally felt could benefit from additional education or training. (Cullen and Gadeken, 1990)

The results of the survey validated the competency model. First it confirmed the importance and the relative uniqueness of the 16 program manager competencies. Out of the 16 competencies, only one (Assertiveness, rank 24) was ranked by current program managers lower than 18th. Additionally, none of the control competencies were ranked higher than 12^{th}. (See Table 8) (Cullen and Gadeken, 1990)

Table 8. DSMC Survey Analysis (Competency Importance)

Rank Order By %	Competency	% of PM's Which Rated as Important (n=128)
1	Sense of Ownership/Mission	73%
2	Long-term Perspective	72%
3	Managerial Orientation	67%
4	Political Awareness	62%
5	Optimizing	60%
6	Results Orientation	57%
7	Innovativeness	55%
7	Systematic Thinking	55%
9	Focus on Excellence	50%
10	Relationship Development	48%
10	Action Oriented	48%
12	Coaches Others	47%
13	Proactive Info Gathering	45%
13	Strategic Influence	45%
15	Creativity	44%
16	Self Control	43%
17	Interpersonal Assessment	42%
18	Collaborative Influence	40%
18	Critical Inquiry	40%
20	Positive Expectations	38%
21	Professionalism	34%
22	Interpersonal Sensitivity	29%
23	Attention to Detail	28%
24	Assertiveness	27%
25	Efficiency Orientation	24%
26	Directive Influence	22%
27	Competitiveness	11%

- Identical numbers denote tie scores.

Source: Cullen and Gadeken, 1990.

The DSMC survey, however, provided minimal information regarding competencies needing further development. Due to the wording and format of the survey question, very few program managers responded to this question. DSMC

concluded that the usefulness of their results in this area was very limited. (See Table 9)

Table 9. Dsmc Survey Analysis (Areas Needing Training)

Rank Order*	Job Competency	% Rated Needs Training (n=128)
1	Interpersonal Assessment	22%
2	Systematic Thinking	19%
3	Managerial Orientation	16%
4	Long-term Perspective	15%
4	Political Awareness	15%
4	Optimizing	15%
4	Relationship Development	15%
4	Proactive Info Gathering	15%
9	Strategic Influence	13%
10	Results Orientation	12%
10	Collaborative Influence	12%
10	Critical Inquiry	12%
12	Innovativeness/Initiative	11%
12	Assertiveness	11%
14	Action Orientation	5%
15	Sense of Ownership/Mission	4%
15	Focus on Excellence	4%
16	Coaches Others	0%
16	Creativity	0%
16	Self Control	0%
16	Positive Expectations	0%
16	Professionalism	0%
16	Interpersonal Sensitivity	0%
16	Attention to Detail	0%
16	Efficiency Orientation	0%
16	Directive Influence	0%
16	Competitiveness	0%

*Identical numbers denote tie scores.
Source: Gadeken, 1990.

DSMC used the results of the research to review the curriculum of the then 20-week DSMC Program Management Course (PMC), attendance at which is

Congressionally mandated for all aspiring DOD program managers. It reviewed the curriculum to ensure that the competencies identified in the study as important for successful program management were covered in order to best prepare participants.

2. NPS Thesis: "Army Program Managers, A Competency Perspective," 1994

In 1993, CPT Bryan McVeigh, a Systems Acquisition Management graduate student at NPS, conducted follow-on research to the DSMC program manager competency study, focusing specifically on Army ACAT-I(C/D) program managers. The researcher used the DSMC Competency Model and similar research methodology to identify and analyze the personal characteristics that distinguish the Army's best ACAT-I(C/D) program managers.

The researcher used a four-step research methodology. First, the researcher developed a Program Manager Competency Survey, using the DSMC survey as a basis. It used the same 27 competencies and their definitions as used in the original DSMC study. The survey respondents were asked to select nine characteristics as the most important and nine characteristics as least important to being an "ideal" program manager. They were also asked to identify six competencies that they felt program managers could most benefit through additional education and training. This survey was completed by 25 of the Army's 35 ACAT I(C/D) program managers, a participation rate of 71%. (McVeigh, 1994)

Next, to distinguish between "successful" and "average" program managers, the survey was administered to all seven of the PEOs/Deputy PEOs responsible for managerial oversight for all 35 of the Army's ACAT I(C/D) programs. They were also

asked to identify the nine most important and nine least important competencies for outstanding program managers. They were then asked to nominate ACAT I(C/D) program managers that best matched their description of an outstanding program manager as described by their selections on the survey. The researcher considered the program managers that were nominated by the PEO's/Deputy PEOs as "successful" PMs for the purpose of his study. The program managers not nominated were considered to be "average" program managers. (McVeigh, 1994)

Third, to gain further insight into how the program managers used the competencies identified in the survey, the researcher interviewed those program managers that had been nominated in the previous step as successful by two or more PEOs. Seven program managers met these criteria and were interviewed via video teleconferencing (VTC) and by face-to-face interviews. They were asked:

- How specific competencies affected the way they managed their programs in terms of the program's internal environment, external environment, program performance, and productivity?
- Which competencies could be effectively taught / developed?
- What educational and previous job experiences were most helpful in preparing to become a program manager? (McVeigh, 1994)

Finally, the researcher conducted a detailed analysis of the extent to which the key program manager competencies are integrated into the Program Managers Course at DSMC and the Systems Acquisition Management curriculum at NPS. The results of this portion of his research are not germane to this study and are not discussed.

The NPS researcher found that his study of Army ACAT I(C/D) program managers validated 14 of the 16 competencies identified in the DSMC Program Manager

Competency Model. Eleven of the 16 DSMC program manager competencies were identified as "most important" or "important" for successful program management by successful and average program managers. He named these "ideal" program manager competencies as "core competencies." Additionally, he identified five competencies which distinguish outstanding program managers from average ones. Three of these five competencies were from the DSMC competency model (Interpersonal Assessment, Relationship Development, Results Oriented) indicated by a "*", and two are DSMC control competencies (Coaches Others, Self-Control), indicated by a "**" in Table 10. (McVeigh, 1994) Based on these results, the researcher developed a Revised Program Manager Competency Model:

Table 10. Final NPS Program Manager Competency Model, 1994

Managing the External Environment	***Managing for Enhanced Performance***
1. Political Awareness 2. Relationship Development 3. *Sense of Ownership / Mission 4. Strategic Influence 5. Interpersonal Assessment *	9. Coaches Others** 10. Innovativeness 11. Self Control** 12. Long-Term Perspective 13. Focus on Excellence 14. Systematic Thinking
Managing the Internal Environment	***Proactivity***
6. Results Oriented* 7. Managerial Orientation 8. Critical Inquiry	15. Action Oriented 16. Proactive Information Gathering

* Distinguish outstanding PMs from average ones (also in DSMC Model).
** Distinguish outstanding PMs from average ones (control competencies in DSMC study).
Source: McVeigh, 1994.

Additional data obtained by the NPS-94 study on each competency is shown in Appendix A.

C. RECENT CHANGES IN THE DOD ACQUISITION ENVIRONMENT

Since the DSMC and NPS studies were completed, there have been many significant changes in the way weapon system acquisitions are conducted. Most of these changes have targeted weapons procurement inefficiencies. Recent efforts to transform the acquisition process seek to make DOD "the smartest, most responsive buyer of the best goods and services, that meet our warfighters' needs, at the best dollar value over the life of the product." (Executive Summary, 1996) This section highlights the most significant legislation and policy initiatives since 1990 to provide the reader with a sense of the fluidity of the acquisition environment within which today's DOD program managers must operate. Additionally, it highlights changes that may have affected how DOD program managers manage the procurement of weapon systems in today's dynamic and complex acquisition environment.

1. Defense Acquisition Workforce Improvement Act (DAWIA), 1990

In May 1990, the House Committee on Armed Services (HASC) released a 776-page assessment of the DOD acquisition workforce. Titled "The Quality and Professionalism of the Acquisition Workforce," it focused on four primary areas of concern:

- Are the services appointing program managers, deputy program managers and contracting officers with the experience, education, and training required by law and regulation, and are program managers being retained in their positions the mandatory four-years or until completion of a major milestone?
- Is there a career program structure to develop qualified and professional acquisition personnel – both military and civilian?
- Is there an appropriate mix of military and civilian personnel within the workforce?

- What impediments exist that must be overcome in order to develop a quality, professional, workforce? ("Discussion of DAWIA," Internet)

The committee's findings might be considered unsettling. Only 11 percent of the 94 reviewed Program Manager turnovers complied with Public Law 98-525; the average tenure of a Program Manager was 24.6 months, not 48. No effective professional development structure existed for the acquisition workforce. In general, civilians remained in positions too long and were not adequately exposed to leadership positions while military officers transferred to other positions too frequently. Although nearly 98% of the military members of the workforce held college degrees, less than half of their civilian counterparts held equivalent degrees. Acquisition education at DSMC, AFIT, and NPS was mostly offered to military officers. In November 1990, the DAWIA was passed by Congress to improve the effectiveness of the military and civilian acquisition workforce through formalized training and career development. The corresponding DOD order, DOD 5000.52, established:

- Education, training, and experience standards for each acquisition position
- The Director of Acquisition Career Management (DACM) for each service and the Office of the Secretary of Defense (OSD)
- An Acquisition Corps of Major/0-4 or GS/GM-13 and above.

2. Federal Acquisition Streamlining Act (FASA), 1994

The Federal Acquisition Streamlining Act impacted nearly all areas of the procurement process in one way or another. Authorization to conduct pilot programs was granted in order to gain insight into possible returns from acquisition reform efforts. Certain reporting waivers were granted and the programs were tied directly to the acquisition reform Benchmarking Group. FASA emphasized the role of market research,

created a preference for purchasing a commercial item, eliminated statutory restrictions on commercial item purchases and provided for the use of commercial practices where commercial items were not purchased. FASA set the Simplified Acquisition Threshold (SAT) at $100,000. All procurements less than SAT (99% of all DOD procurements) were relieved of numerous statutory requirements. The Federal Acquisition Computer Network (FACNET) was created, allowing electronic correspondence between the Government and the vendor throughout the acquisition process. Simplified Acquisition Procedures (SAP) were established to accommodate FACNET and electronic commerce/electronic data interchange (EC/EDI). Finally, FASA reduced the requirements for Cost or Pricing Data, raising the threshold to $500,000 and provided for waivers and exceptions above that amount. The passage of FASA was the beginning of the revitalized acquisition reform movement. ("Acquisition Reform Legislation," Executive Summary, 1996)

3. Federal Acquisition Reform Act (FARA), 1996

In 1996, Congress passed the Federal Acquisition Reform Act, further streamlining competition requirements. It reformed Information Technology (IT) acquisition by repealing former legislation (Brooks Act, 1965) that had made IT procurement more cumbersome. Additionally, FARA allowed contracting officers to limit the number of bidders considered in the competitive range and increased the "other than full and open competition" threshold from $10 million to $50 million. FARA also further broadened the FASA simplified acquisition thresholds to include all commercial items up to $5 million. The passage of FARA made evident that Congress was fully

supporting DOD's acquisition reform initiatives. ("FY-1996 Defense Authorization Act Hailed As Victory For Acquisition Reform," Internet)

4. Department of Defense 5000 Series Update

In March of 1996, Secretary of Defense, William Perry continued the ever-growing acquisition reform movement by revamping the DOD 5000 Series, the regulations covering acquisition. The Series update included six new themes that are now considered the six themes of acquisition reform:

- Teamwork: optimizes overall performance by creating cross-functional integrated product teams (IPT) that work together throughout the development process. This is critical since the ability to affect the life cycle cost of a program is exponentially related to the timeliness of the decisions, as illustrated in Figure 1.

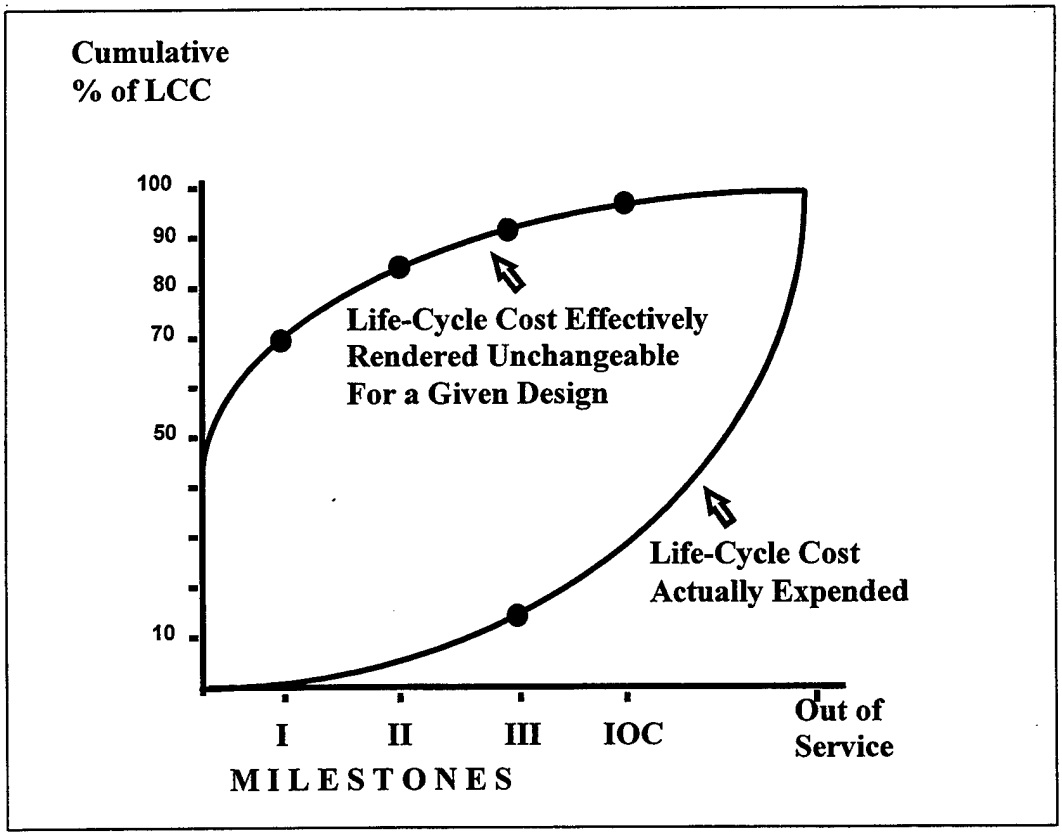


Figure 1. Impact of Time on Ability to Affect Life-Cycle-Cost (DSMC, PMT 302 Course, 1998)

- Tailoring: enables the Milestone Decision Authority (MDA) to apply common sense and sound business practices to accomplish tasks, allowing flexibility in the process based on the program's requirements.

- Empowerment: gives the user representative, the program manager, and his acquisition team, the authority to make decisions and take required actions in an expeditious manner at all levels.

- Cost as an Independent Variable (CAIV): forces trade-offs among elements of cost, schedule, and performance in an effort to achieve the best value and lowest total ownership cost (TOC).

- Commercial Products: encourages the procurement of commercial items when suitable and available, rather than a developing an item, significantly reducing the time it takes to field an item.

- Best Practices: encourages the use of the most effective tools / methods to accomplish the task.

Table 11 shows the enablers (acquisition reform initiatives) used to accomplish the above discussed themes of acquisition reform.

Table 11. Acquisition Reform Themes and Enablers

Themes	Teamwork	Tailoring	Empowerment	CAIV	Commercial Products	Best Practices
Enablers (Acquisition Reform Initiatives)	IPPD/IPT	Open System Approach	IPPD/IPT	IPPD/IPT	Open System Approach	Open System Approach
		Statement of Objectives		Minimize Support Costs	Technology Insertion	Statement of Objectives
		Perf-based Specs		Affordability	Perf-based Specs	Perf-based Specs
		Non-Govt Specs/Stds		Reduce Cycle Times	Non-Govt Specs/Stds	Non-Govt Specs/Stds
		Best Value Contracting			Perform Mkt Survey	Best Value Contracting
					Use NDI	Use NDI
					Use COTS	Use COTS
					ATDs/ACTDs	Modeling & Simulation
						Contractor Past Performance

Source: V-22 IPT Government Participation Concept of Operations, PMA-275 Interoffice Memorandum, 2 July 1993.

The effective implementation of these acquisition reform themes and initiatives are causing a fundamental change in the DOD acquisition culture. This ongoing transformation will continue to directly affect the way current DOD program managers manage their programs.

D. CHAPTER SUMMARY

This chapter has provided a brief overview of the principal research efforts conducted previously in the area of DOD program manager competencies, including studies by DSMC and NPS. It has provided a description of the objectives, methodologies, and findings of those studies to familiarize the reader with the research to which this study is a follow-on effort. Based on their research both the DSMC and NPS studies developed a Program Manager Job Competency Model which identified the important competencies for program managers to possess, including several that distinguished "Outstanding" program managers from average ones.

Finally, the principal legislative changes were discussed, including DAWIA, FASA, FARA, and the DOD 5000 Series Update. These changes widesweeping changes highlight the dynamic environment to which successful program managers must adapt, and within which they must operate.

III. METHODOLOGY

A. OVERVIEW

A quantative and qualitative approach was used that included a literature review, personal observations, and a data collection instrument. The methodology was developed in order to answer the following seven key questions:

- How does one determine which program manager competencies should be evaluated?
- How does one identify outstanding program managers as research participants?
- How does one best collect the data from research participants?
- How does one determine the relative importance of competencies to Army program managers?
- How does one identify those competencies that program managers feel need mprovement?
- How does one determine the differences between the results of this research and previous studies?

B. WHICH PROGRAM MANAGER COMPETENCIES SHOULD BE QUESTIONED?

The starting point for this research was to determine which program manager competencies should be analyzed. As discussed in Chapter II, the DSMC study, through a comprehensive, detailed critical behavior interview and validation process, identified 16 competencies (See Table 7) that contribute to effective program manager performance. These same 16 competencies are the primary focus of this research. However, all 27 of the competencies used in the DSMC validation survey are analyzed (See Table 8). Analyzing the same competencies as in the DSMC and NPS studies provided maximum

consistency and comparability of data to identify changes or trends over the past decade. (Cullen and Gadeken, 1990)

C. IDENTIFY "OUTSTANDING" PROGRAM MANAGERS AS RESEARCH PARTICIPANTS

Next, in order to ensure the research would provide insight into what characteristics are associated with outstanding program manager performance, the researcher had to select program managers who were recognized as "outstanding" to be research participants.

Annually, the Secretary of the Army for Research, Development, and Acquisition (SARDA), solicits nominations for the Department of the Army, Program Manager of the Year Award, from PEOs and Deputies for Systems Acquisition (DSAs). These organizations provide the managerial oversight for all of the Army's acquisition programs. Each PEO/DSA may only nominate, using the format at Appendix B, one person from each of the following categories: Project Manager and Product Manager. The nominations are then assessed and scored by an evaluation board comprised of seven General Officers and Senior Executive Service personnel. (SARDA Interview, 1998) The evaluation criteria are:

- Resource management achievements (financial and manpower)
- Acquisition streamlining and innovations achievements
- Program complexity
- Exceeding agreed upon program objectives

Annually, approximately 20 Army acquisition managers (project and product) are nominated by PEOs and DSAs, from which one from each category (two if a tie in

scoring) are selected for the award. Based on the FY99 PEO / DSA structure 181 project and program managers are eligible for the award. (SARDA Interview, 1998) Having been nominated for the award indicates that the program manager is successful, highly respected by his superiors, and recognized within the Army Acquisition Corps as an outstanding program manager.

With this in mind, acquisition managers that had been nominated for the Department of the Army, Program Manager of the Year Award, for the period 1994-1997, inclusive, were considered to be "outstanding" program managers for the purpose of this study. (The period 1994-1997 was chosen since the previous NPS program manager competency study was conducted in 1993-1994.) Sixty-four program managers met this criterion and were identified as outstanding program managers to be potential research participants. (SARDA Interview, 1998) The actual number of participants was dependent upon the ability of the researcher to locate them and their ability and willingness to participate.

The DSMC study found that there was no significant difference in the key competencies used by major program managers and non-major program managers. It also found that there was no significant difference between the competencies used by program managers in the various services (e.g., Army, Navy, and Air Force) (Cullen and Gadeken, 1990). It is assumed, for the purposes of this research, that these findings hold true today, and that the data collected from outstanding Army program managers will be representative of program managers across the services, regardless of their program size.

D. COLLECTION OF DATA

Data were collected from outstanding program managers by administering a two part, 14 question survey (Appendix C). The competency surveys used by DSMC and NPS were used as a foundation for the survey developed to support this study. Based on the recommendations of those researchers, several changes were made to the competency survey.

First, the researcher slightly modified the survey format to simplify it for easier comprehension and to enable electronic administration. For instance, in Part I, a column was added titled "Least Important Characteristics" and the column title "Ideal Program Managers" was renamed "Most Important Characteristic." (See p. 2, Appendix C) In addition, the undergraduate and graduate degrees were combined on a single chart. Second, to avoid misinterpretation, the competency titled "Professionalism" was renamed "Professional Expertise." Third, several of the demographic questions were modified with updated information. Finally, five open-ended questions, three of which were used during interviews in the previous research, were added to Part II. (See pp. 7-8, Appendix C) The researcher solicited these free-form responses in an effort to gain further insight to the previous responses.

The original intent of the researcher was to administer the survey using an interactive, internet-based, web site. The survey participant would have acessed the survey via the world-wide-web, completed it on-line, and submited the data directly to the researcher. The researcher abandoned this effort due to unresolvable technical issues concerning the functionality of interactive forms using Microsoft FrontPage98 extensions. The web-based survey would possibly have simplified data collection since

the data submitted could have been merged directly into the data base, eliminating the need for the researcher to input data. However, using an alternate survey method did not adversely affect the integrity of the data or the results of this study.

Rather than a web-based survey, the following data collection methodology was used to administer the survey:

- Program manager participation was solicited telephonically or by e-mail (See Appendix D).
- The competency survey was distributed electronically as a Microsoft Word97 e-mail attachment to an instructional e-mail. (See Appendix E) In order to facilitate candid responses, the program managers were guaranteed that their individual responses would be kept confidential.
- Program managers downloaded the survey and completed it electronically.
- Program managers returned the survey directly to the researcher electronically or via facsimile.
- Upon receipt, the survey's competency and demographic data was entered into a Microsoft Excel97 spreadsheet, facilitating data manipulation and analysis. The free-form comments were consolidated and ordered for further analysis.

Before distributing the revised competency survey, it was administered to several faculty members and several Systems Acquisition Management graduate students of the Systems Management Department at NPS, including two former program managers. Additionally, it was reviewed by Professor Owen Gadeken, a co-author of the original DSMC competency study. Based on their comments, several further minor changes were made to the survey.

It is considered the responses received were adequate for this research effort. The survey response rate attained in this research was 93%. With 39 surveys received, the data is assumed to approximate a normal distribution. Finally, the high caliber, detailed,

free-form responses to the six open ended questions provided the researcher with a substantial quantity of anecodotal feedback.

E. DETERMINE THE RELATIVE IMPORTANCE OF COMPETENCIES

Using the 27 competencies identified in the 1990 DSMC study, survey respondents were first asked to select the nine characteristics that they felt were "the most important to outstanding program managers." Second, they were asked to select the nine characteristics that they felt were "the least important to outstanding program managers." These responses, based on the average frequency of their selection as most important or least important competencies, were then rank ordered from most important to least important. This provided a clear representation of the relative importance of these 27 characteristics as viewed by outstanding program managers. Additionally, the answers to Questions 9 and 10 (open-ended questions) provided further insight into the competencies which program managers viewed as most important to being an outstanding program manager. This facilitated further analysis.

F. IDENTIFY THOSE COMPETENCIES WHICH NEED DEVELOPMENT

Using the same 27 competencies, project managers were asked to select the six competencies that they felt most needed futher development and that "additional education and training programs would benefit the greatest number of program managers". These responses were also rank ordered, based on the average frequency of their selection, from the competencies "most needing development" to "least needing development." This provided a clear representation of the relative need for further competency development as viewed by outstanding program managers.

G. COMPARISON OF RESULTS WITH PREVIOUS STUDIES

By using the same competencies and a methodology similar to those used in both the DSMC and the NPS studies, the data was consistent and easily comparable across the studies. The most/least important competencies and the competencies identified as needing development were graphically compared and contrasted, analyzing the data over time, to determine trends or shifts in what outstanding program managers think about specific competencies.

H. CHAPTER SUMMARY

This study analyzes the same 27 competencies as the DSMC and NPS studies to provide maximum consistency and comparability of data. Based on the recommendations of the previous researchers and to allow electronic data collection, the competency survey was slightly modified. Format changes simplified the survey and several open-ended questions were added. Program managers were selected for participation based on their nomination for the Department of the Army, Program Manager of the Year Award. The survey was electronically distributed and returned. The data was then analyzed to determine each competency's importance relative to one another and to determine which competencies are viewed as needing the most development. The results of this study were then compared with the findings of the two previous studies to illustrate trends or shifts in the competencies of outstanding program managers.

IV. ANALYSIS AND DISCUSSION

A. OVERVIEW

This chapter presents the findings of the Program Manager Competency Survey, the primary research instrument used in this study. First, the final survey sample and its demographics are described. The second section presents the principle findings of the survey. Third, based on the findings of this research, a revised Program Manager Job Competency Model is proposed. Fourth, each competency included in the model is analyzed. Finally, the findings of this research are then compared to the findings of the DSMC model and the NPS-94 Model, including the relative importance of each competency and competencies that program managers identified as needing further development.

B. SURVEY SAMPLE AND DEMOGRAPHICS

1. Survey Sample

The initial survey sample for the Program Manager Competency Survey was the sixty-four program managers that were nominated for the Department of the Army, Program Manager of the Year Award, for the period 1994-1997. (Morton, 1998) Of these 64 program managers, the researcher successfully contacted 42, all of whom agreed to participate by completing the survey. The survey was administered to those 42 program managers, 39 of whom provided responses, an approximate response rate of 93%.

2. Survey Demographics

Demographically, the typical survey respondent was male; active duty; a colonel or higher in rank. Their program management experience had been as a Product

Manager, on a Project Management Staff, or as a Project Manager. Over one-third had ACAT I/D program experience. More than half of the respondents had experience with programs in the Engineering and Manufacturing Development (EMD) phase. They had attended the DSMC Advanced Program Management Course (APMC), PMT302. Additionally, they held an engineering undergraduate degree and a graduate degree in business. See Table 12 below.

Table 12. Competency Survey Demographics (n=39)

Rank		**Program Management Job Experience***		**Acquisition Category Experience***		**Program Phase Experience***		**Formal Education***	
Rank	% PMs	Position	% PMs	ACAT	% PMs	Phase	% PMs	Degree	% PMs
0-7	8%	Product Manager	85%	I / D	38%	EMD	64%	Undergrad. Engineering	54%
0-6	59%	Project Manager Staff	69%	I / C	23%	PFDOS	51%	Graduate Business	51%
0-5	33%	Project Manager	62%	III	23%	PDRR	38%	Graduate Engineering	38%
		Army/OSD Staff	54%	II	18%	CE	10%	Undergrad. Business	21%
		Test and Evaluation	31%	IV	3%	Other	8%	Undergrad. Physical Sciences	10%
		New Equip. Fielding Officer	18%			Demil. & Disposal	3%	Graduate Liberal Arts	10%

C. COMPETENCY SURVEY FINDINGS

1. Competency Importance Analysis

Each survey respondent was asked to review the definitions for the same 27 job competencies that had been used in the previous DSMC and NPS-94 studies. They were asked to select the nine characteristics they thought were the "most important" and the

nine characteristics they thought were the "least important" to be an outstanding program manager. To analyze the survey data, the following weights were applied to each response:

- "Most Important" Characteristic = 3
- "Least Important" Characteristic = 1
- "Average Importance" Characteristic (not identified as "most important" or "least important") = 2

After these weights were applied to each response, the weighted sample arithmetic mean (x-bar) and sample standard deviation (S) for each job competency was calculated. The competencies were then rank ordered according to their mean. Table 13 shows the frequency of responses ("most important," "important," or "least important"), x-bar, and S, for each of the 27 competencies.

Table 13. Competency Importance Data Analysis

Rank* Order by Mean	Competency	Frequency (n=39)			Sample Mean	Sample Standard Deviation
		Most Important	Important	Least Important		
1	Long-term Perspective	27	7	5	2.564	0.718
2	Innovativeness	24	10	5	2.487	0.721
3	Political Awareness	21	14	4	2.436	0.680
4	Sense of Ownership/Mission	24	7	8	2.410	0.818
5 (Tie)	Action Oriented	24	4	11	2.333	0.898
5 (Tie)	Relationship Development	18	16	5	2.333	0.701
7	Strategic Influence	22	10	7	2.308	0.863
8	Results Oriented	18	12	9	2.231	0.810
9	Focus on Excellence	13	20	6	2.179	0.683
10 (Tie)	Collaborative Influence	17	11	11	2.154	0.844
10 (Tie)	Professional Expertise	16	13	10	2.154	0.812
12 (Tie)	Coaches Others	12	19	8	2.103	0.718
12 (Tie)	Creativity	13	17	9	2.103	0.754
14	Systematic Thinking	11	20	8	2.077	0.703

Table 13 (Continued)

Rank* Order by Mean	Competency	Frequency (n=39)			Sample Mean	Sample Standard Deviation
		Most Important	Important	Least Important		
15	Critical Inquiry	13	15	11	2.051	0.793
16	Managerial Orientation	12	16	11	2.026	0.778
17	Interpersonal Assessment	8	18	13	1.872	0.732
18 (Tie)	Proactive Info Gathering	8	17	14	1.846	0.745
18 (Tie)	Positive Expectations	8	17	14	1.846	0.745
20 (Tie)	Optimizing	9	14	16	1.821	0.790
20 (Tie)	Self Control	6	20	13	1.821	0.683
22	Attention to Detail	10	21	8	1.718	0.857
23	Efficiency Orientation	2	18	19	1.564	0.598
24 (Tie)	Interpersonal Sensitivity	3	14	22	1.513	0.756
24 (Tie)	Assertiveness	6	8	25	1.513	0.644
26	Directive Influence	5	5	29	1.385	0.711
27	Competitiveness	1	5	33	1.179	0.451

*Identical numbers denote tie sample means

Figure 2 graphically illustrates the sample mean rating of each of the competencies analyzed.

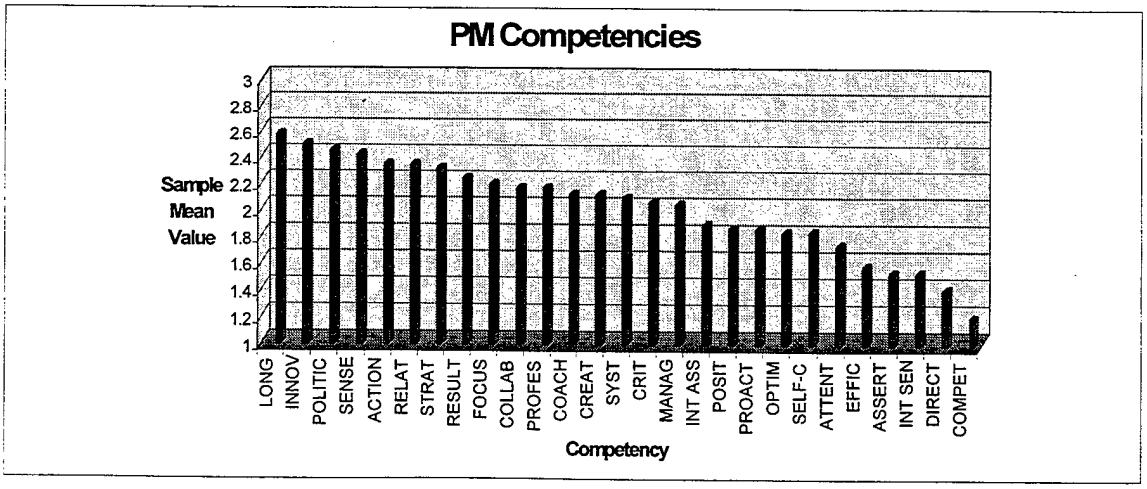


Figure 2. Program Manager Competencies Sample Mean of PM Competencies

Because each of the 27 competencies had to be identified by the survey respondent as either "most important," "average importance," or "least important," a mean interval scale composed of three 0.6667 wide intervals (2/3=0.6667) was developed. Six competencies with a sample mean of 2.33 or higher (the top one-third of the potential rating value) were identified as the "most important" competencies for an outstanding program manager to possess:

- Long Term Perspective.
- Innovativeness.
- Political Awareness.
- Sense of Ownership/Mission.
- Action Oriented.
- Relationship Development.

The above six competencies are included in the revised Program Manager Job Competency Model.

Three other competencies, although each have a sample mean below 2.33, were determined to be "most important" based on confidence interval analysis (discussed later in this chapter):

- Strategic Influence.
- Results Oriented.
- Focus on Excellence.

These three competencies are also included in the revised program manager job competency model.

Thirteen competencies, each with a sample mean rating of 2.32 to 1.67, were identified as being competencies of "average importance" for outstanding program managers to possess (See below).

- Collaborative Influence*
- Professional Expertise.*
- Coaches Others*
- Creativity*
- Systematic Thinking*
- Critical Inquiry*
- Managerial Orientation*
- Interpersonal Assessment
- Proactive Information Gathering
- Positive Expectations
- Optimizing
- Self Control
- Attention to Detail

Of these 13 competencies, seven have sample mean values above 2.0 (indicated by "*" above), the middle of the interval scale, and are considered to be of relatively more importance than the other six competencies. Analysis of their mean value confidence intervals, (discussed later in this chapter), further corroborate this finding. These are the final seven competencies included in the revised program manager job competency model.

The remaining five competencies, each with a sample mean rating of 1.66 or less, were identified as the "least important" competencies for an outstanding program manager to possess:

- Efficiency Orientation.
- Interpersonal Sensitivity.
- Assertiveness.
- Directive Influence.
- Competitiveness.

Next, to facilitate further statistical inferences concerning the program manager competencies, and to assess the variance of the sample mean of each competency, a confidence interval estimate of the population mean, μ, was calculated for each competency. The confidence interval estimate was determined by applying "Student's t distribution," developed by William S. Gosset. (Levine, Berenson, Stephan, 1997) The following variables were used: sample size (n) =39; degrees of freedom (n-1) = 38; confidence level = 99%; sample mean (x-bar) of each competency; sample standard deviation (S) for each competency. The resulting confidence interval estimate, including the lower and upper interval limits, of the population mean for each competency are shown in Figure 3.

Analysis of the confidence intervals showed (at a 99% confidence level) that the sample means of each of the six competencies identified as "most important" for outstanding program managers are greater than those identified as "least important." In

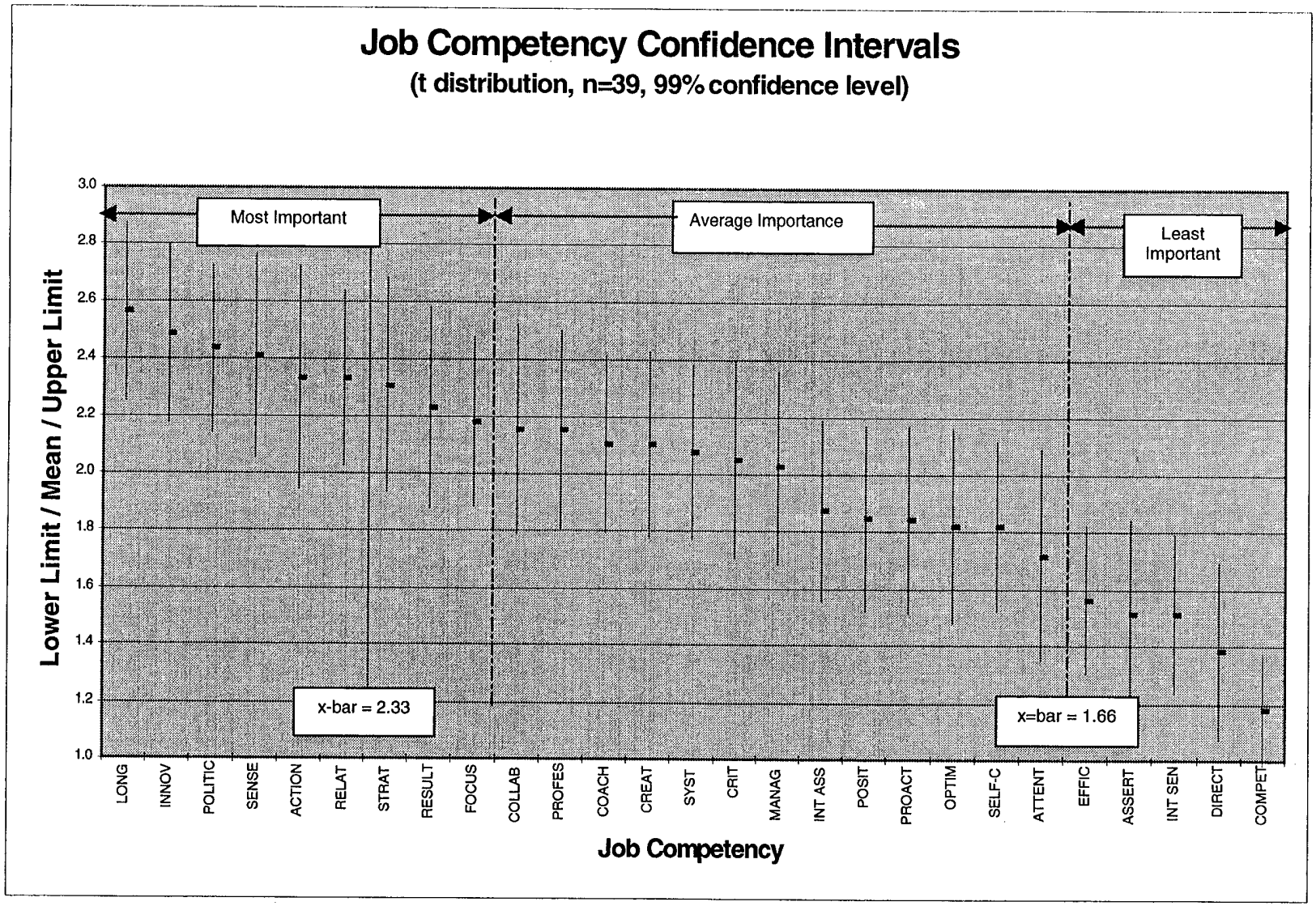


Figure 3. Competency Confidence Intervals

other words, there is no overlap between the confidence intervals of those identified as "most important" and "least important." Stated another way, the researcher is 99% sure that the actual population mean (μ) rating for each job competency is located within the confidence intervals calculated. Using the t distribution at a 99% confidence level allows a high level of confidence in statistical inferences made about the entire program manager population using a sample size of 39 program managers.

Additionally, three of the competencies identified as "average importance" using the mean interval scale also have mean confidence intervals which are greater than, and do not overlap with, the confidence intervals of the "least important" competencies. (See Figure 3) They are: Strategic Influence, Results Oriented, and Focus on Excellence. These three competencies should, therefore, also be considered "most important" for outstanding program managers, as they are also statistically distinguishable from the "least important" competencies.

The thirteen competencies rated "average importance" range in sample mean values from 2.154 (Collaborative Influence) to 1.718 (Attention to Detail). As mentioned previously, seven of these competencies are identified as relatively more important than the remaining six. Analysis of their mean value confidence intervals (at a 99% confidence level) show that the arithmetic mean (μ) value of each of these seven competencies could be greater than 2.33, (the top third of the mean value interval scale), in the population as a whole. Similarly, analysis of the mean value confidence intervals (at a 99% confidence level) of the remaining six "average importance" competencies show that the arithmetic mean (μ) value of each of these seven competencies could be less than 1.66, (the bottom third of the mean value interval scale), in the population as a whole. See Appendix F for detailed data and confidence interval calculations.

2. Development Area Analysis

Using the same 27 job competencies that were used to identify the "most important" and "least important" characteristics, each survey respondent was asked to select the six characteristics that they felt needed further development. Areas "needing development" were those competencies in which the survey respondent thought that additional education and training programs would benefit the greatest number of program managers.

To analyze the survey data, the percentage of the respondents that had identified each characteristic as "needing development" was calculated. (See Table 14) Six of the

Table 14. NPS-99 Competency Development Areas

Rank Order by %	*Competency*	*% of PMs That Identified as "Needs Development"*
1	Political Awareness	64%
2	Strategic Influence	54%
3 (Tie)	Long-term Perspective	36%
3 (Tie)	Systematic Thinking	36%
3 (Tie)	Critical Inquiry	36%
6	Collaborative Influence	33%
7 (Tie)	Relationship Development	31%
7 (Tie)	Interpersonal Assessment	31%
7 (Tie)	Efficiency Orientation	31%
10 (Tie)	Innovativeness	28%
10 (Tie)	Coaches Others	28%
12	Managerial Orientation	26%
13 (Tie)	Proactive Info Gathering	21%
13 (Tie)	Creativity	21%
15 (Tie)	Self Control	15%
15 (Tie)	Professional Expertise	15%
15 (Tie)	Interpersonal Sensitivity	15%
18 (Tie)	Sense of Ownership/Mission	13%

Table 14 (Continued)

Rank Order by %	*Competency*	*% of PMs That Identified as "Needs Development"*
18 (Tie)	Optimizing	13%
18 (Tie)	Results Oriented	13%
21 (Tie)	Focus on Excellence	10%
21 (Tie)	Positive Expectations	10%
23 (Tie)	Action Oriented	8%
23 (Tie)	Assertiveness	8%
25 (Tie)	Attention to Detail	5%
25 (Tie)	Directive Influence	5%
27	Competitiveness	0%

27 competencies were identified as needing development by more than one-third (33%) of the program managers surveyed:

- Political Awareness.
- Strategic Influence.
- Long-term Perspective.
- Systematic Thinking.
- Critical Inquiry.
- Collaborative Influence.

Of these six competencies, two were identified by more than 50% of the program managers as needing further development: Political Awareness (64%), and Strategic Influence (54%). Three of the six competencies were identified by an equal number of program managers (36%) as needing further development: Systematic Thinking, Long-term Perspective, and Critical Inquiry.

All six of these competencies identified as areas needing further development were also identified by the same program managers as being important enough to be

included in the revised program manager competency model. Additionally, three of these six competencies needing further development (Political Awareness, Strategic Influence, and Long-term Perspective) were identified as "most important" for program managers to possess. Figure 4 presents the results for each of the 27 competencies.

D. REVISED PROGRAM MANAGER JOB COMPETENCY MODEL

The survey results indicate that 16 of the 27 job competencies analyzed were identified by outstanding program managers as important competencies for today's program managers to possess. Nine of those 16 competencies are distinguishable as "most important" for outstanding program managers to possess. Based on this evaluation, the revised Program Manager's Job Competency Model is shown in Table 15:

Table 15. Revised Program Manager Job Competency Model

Managing the External Environment	***Managing for Enhanced Performance***
1. Political Awareness * 2. Sense of Ownership / Mission* 3. Relationship Development* 4. Strategic Influence*	10. Long-Term Perspective* 11. Innovativeness* 12. Focus on Excellence* 13. Creativity 14. Coaches Others 15. Systematic Thinking
Managing the Internal Environment	***Proactivity***
5. Results Oriented* 6. Collaborative Influence 7. Professional Expertise 8. Critical Inquiry 9. Managerial Orientation	16. Action Oriented*

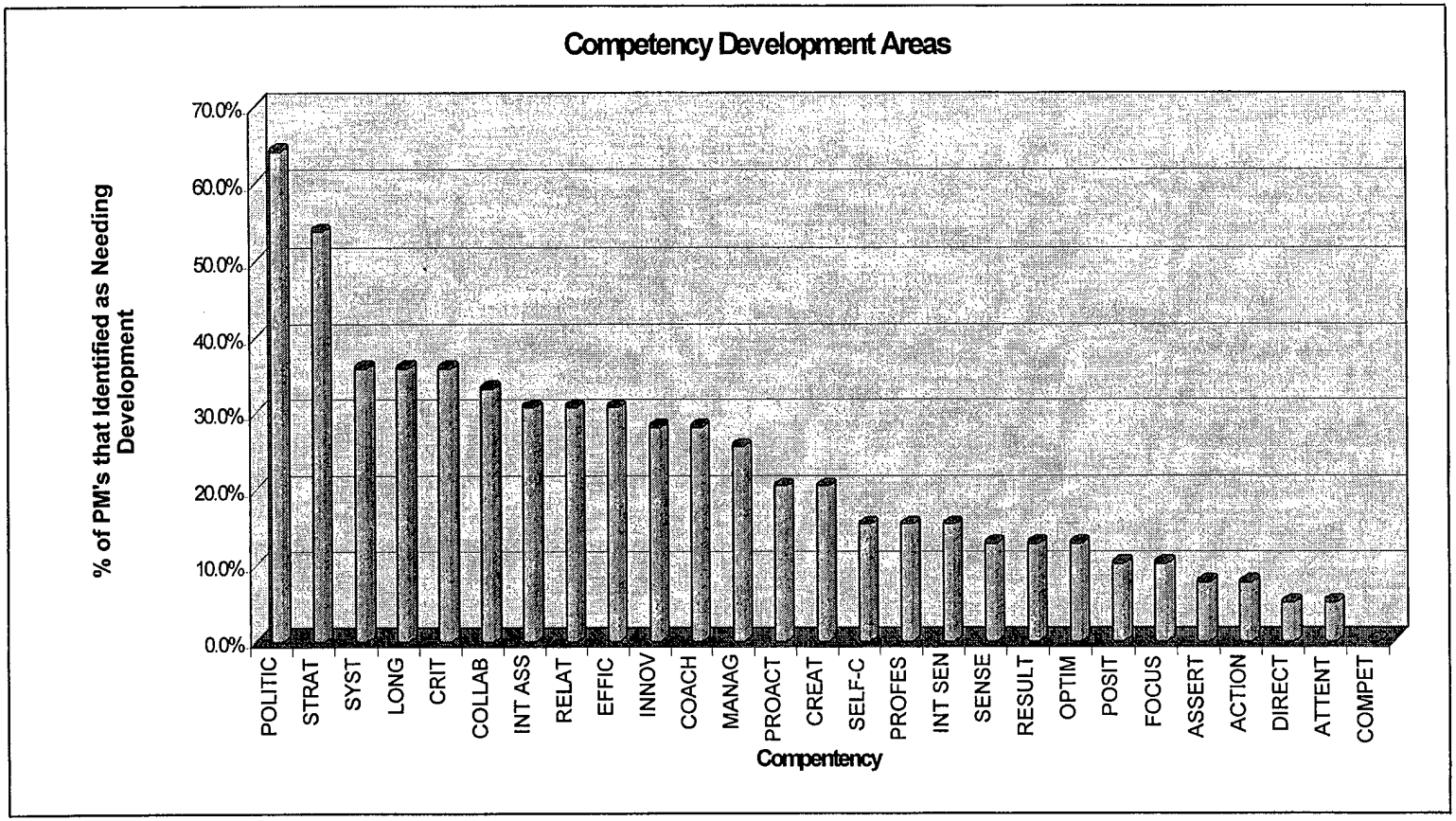


Figure 4. Competency Development Interval Scale

Based on the data obtained from outstanding Army program managers, these competencies are important for today's Army program managers to possess.

E. ANALYSIS OF PROGRAM MANAGER JOB COMPETENCIES

To gain further insight into why the 16 competencies included in the job competency model were identified as important by the program managers, two open-ended questions were included in the survey:

- What do you view as the most important personal characteristic for your success as a program manager? Why?
- Are there any other personal characteristics not listed in this survey that you would consider critical to being an outstanding Army program manager?

This section will examine each of the 16 competencies included in the Program Manager Job Competency Model in light of their responses to those survey questions that corroborated the previously discussed statistical findings.

It is important to remember, however, that due to the sample variance for each of the competencies included in the Program Manager Job Competency Model, the actual mean of each competency for the entire program manager population (μ) is indistinguishable (at a 99% confidence level) from the means of the other competencies of the model. Competencies identified as "most important" are, however, statistically distinguishable from those identified as "least important," which were not included in the job competency model. Note: identical rankings of the below competencies indicate identical sample mean values.

1. "Most Important" Competencies

a. Long Term Perspective

Long Term Perspective was defined in this study as: *Taking the time needed to think through future issues and problems.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
1	27	7	5	2.564	0.718	36%

This competency had the highest weighted sample mean of the 27 competencies analyzed, indicating that it is considered the most important competency by this sample of 39 program managers. It is identified statistically as being a "most important" competency, population wide. Importantly, long-term perspective was also identified by more than one third (36%) of the program managers as competency area needing further development through education or training.

These statistical findings were corroborated by the program managers' comments. Having a long-term perspective was mentioned directly or indirectly more than any other competency. As one program manager put it, a program manager must maintain a:

> big picture focus – keep the whole effort, along with the people involved, in focus, not letting the day to day details and tasks become more important than the overarching goal.

Another stated:

> ...look beyond today's crisis and keep the end state in focus. Doing so allowed for strategic posturing of the program, implementation of Army priorities, and program modifications without getting overly consumed in the "short knife fight".

Having a long-term perspective allows the program manager to effectively anticipate future program requirements, potential areas of future crisis, and resource requirements. He can then develop a strategy and manage the program in anticipation of those future events, "steering around the minefields and tank ditches rather than conducting a frontal breech."

b. Innovativeness

This study defined, *Innovativeness* as: *Championing or initiating new ways of meeting program requirements.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
2	24	10	5	2.487	0.721	28

This competency had the second highest weighted sample mean of the 27 competencies analyzed, indicating that it is considered one of the most important competencies by this sample of 39 program managers. Additionally, it was also identified statistically as being a "most important" competency population wide.

In today's acquisition environment program managers are expected to "think outside the box," to do whatever is best for the program, as long as its not prohibited by current legislation or regulations. In addition, even if it is, program managers are encouraged to seek waivers or exception to policies from the appropriate level of authority if there is a better way for that specific program. One program manager adamantly stated:

> if something is not prohibited by law or regulation or can be waivered, and it will benefit your program, then do it! Push the system until it cries out in pain to get what is needed to make your program successful!
>
> Another stated:
>
> You have an obligation to challenge the system. In particular, just because something has always been done a particular way does not mean it should not change. At the same time you must evaluate the process and not make change for change sake. All decisions should be made based on making the program successful in delivering the end item the Government charged you to manage.

A sound dose of common sense must be applied to the acquisition process. If something does not make sense, program managers must not feel restricted by precedent set by previous programs, since each program is inherently different. The imagination of the program manager is thereby leveraged to provide a better system to the warfighter faster and at a better value. He should not feel confined by bureaucracy.

c. Political Awareness

Political Awareness was defined in this study as: Understanding whom the influential players are, what they want, and how to best work with them.

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
3	21	14	4	2.436	0.680	64

This competency had the third highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as one of the most important competencies. It was also statistically identified as being a "most important" competency population wide. Additionally, Political Awareness had the smallest sample standard deviation of 16 competencies included in the job

competency model. This indicates a relatively high level of consensus regarding its importance to program managers. Importantly, Political Awareness was also identified by 64% of the program managers as the competency area most needing further development through education or training.

Because defense system acquisition is directly reliant on Congressional budget authorizations, politics affect program managers at all levels. Program managers must be aware of the many individual agendas, competing interests, and divergent organization objectives. Being politically astute allows a program manager to be able to make decisions and trade-offs for the success of his program and to maintain its competitiveness. Understanding the positions of the primary program stakeholders at the Army, DOD, and Congressional levels is vital. One former program manager, now a general officer, stated, "An Army product, project, or program manager must operate at a higher level of (political) awareness...than at any other comparable level of responsibility [in the Army]." Program managers must understand how to effectively conduct their business in a politically sensitive and politically energized acquisition environment for program success.

Program managers also noted that the first formal political awareness training for Army officers does not occur until the Pre-Command Course (PCC), after selection to Battalion Command. Because of today's "single track" career progression, Army program managers may not receive any formal political awareness training until they are selected as a project manager and attend DSMC's Advanced Program Management Course, PMT302.

d. Sense of Ownership/Mission

This study defined Sense of *Ownership/Mission* as: *Seeing self as the one responsible for the overall success of the program; articulates problems or issues from a broader organizational or mission perspective.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
4	24	7	8	2.410	0.818	13%

This competency had the fourth highest weighted sample mean of the 27 competencies analyzed, indicating that it is also considered to be one of the most important competencies by this sample of 39 program managers. It was also statistically identified as being a "most important" competency population wide.

The program manager must be the leading champion for his program and must be personally committed to its success. As one program manager put it, "You must believe in your program and be totally dedicated to its success." Another stated, "Program managers must be persistent and willing to make what ever sacrifice it takes to keep the program moving. Usually that means long hours and lots of travel. High energy level is a must."

In today's constrained and competitive procurement budget environment, this dedication also often requires the program manager to aggressively market his program. One program manager bluntly described it this way, "You're a bill payer, that's all they [Army/DOD Comptroller] look at. You're a bill payer! If you don't understand that you're in trouble." The program manager must promote his system to maintain its visibility and requirement to the budgetary decision-making authorities. However, his

personal crusade for the program must be tempered by the overarching interests of the Army, best summarized by a program manager as, "Army first – program second!"

This competency also entails providing a sense of mission and unified effort for the program manager's staff and partner offices. One program manager stated:

> I have found that if all understand the commanders' intent...and realize that the job of program management/materiel development/force modernization is a military operation other than war, all can remain focused on the objective. The PM's job is to establish the intent and guide all to accomplishing it.

The responsibility bestowed upon a program manager is enormous and must be assumed respectfully. One program manager said, "I am given the job to, and depended on, to get the program successfully developed and fielded to our soldiers."

*e. **Action Oriented***

Action Oriented was defined as: Reacting to issues and problems energetically and with a sense of urgency.

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
5	24	4	11	2.333	0.898	8%

This competency had the fifth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as one of the most important competencies. It was also statistically identified as being a "most important" competency population wide. It, however, had the largest sample standard deviation of 16 competencies included in the job competency model indicating a smaller consensus regarding its relative importance.

The very nature of program management, due to its complexity, requires the program manager to proactively monitor the status of his program. He cannot be a passive manager. He must anticipate crisis and act decisively. One program manager stated:

> Decision making (ability) is critical. Even if they are wrong, making them is always better than deferring them. A wrong decision allows you to ID boundaries, correct, and continue – especially in EMD. Deferral wastes time and $. Not making them at all is dereliction of duty.

Another stated, "Time and personnel resources are too limited to allow for passive growth – letting the "organization" grow towards mission accomplishment...." The program manager must always keep his "eye on the procurement clock", carefully tracking issues, aggressively pursing early resolution. Yet another program manager said:

> Program change is a given, it's also continuous. Therefore, the ability to adapt to change, assess risk, and keep the end state in focus better allows PM's to manage change rather than be managed by it.

One program manager opened,

> [A program manager must be]...a quick and decisive decision-maker. Gather the facts, listen to the arguments, weigh the alternatives, and make a decision. The grip of bureaucracy will set in and become an immovable object the longer one waits. People inherently do not like to make decisions, as they become responsible for the outcome. A quick deciding PM will get the support in most situations since he is now the point of blame. And, don't forget time is money.

Another program manager stated, "...[One must have] the ability to quickly identify problems and initiate a plan for resolution often involving negotiation and compromise."

f. Relationship Development

Relationship Development was defined in this study as: *Spending time and energy getting to know program sponsors, contractors, or other influential people.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
5	18	16	5	2.333	0.701	31%

This competency had the fifth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as one of the most important competencies. It was also statistically identified as being a "most important" competency population wide. Additionally, it had the third smallest sample standard deviation of the 16 competencies included in the job competency model that indicates a larger consensus regarding its relative importance.

Building strong personal and professional relationships with key personnel external to the program office is necessary to being a successful program manager. Because the acquisition process involves so much coordination, and requires "buy-in" from various organizations, developing and maintaining relationships facilitates the process by increasing the level of program familiarity. One program manager stated, "It is absolutely essential to be known by the hierarchy that can have an influence on your program. A little "schmoozing" can go a long way." These influential personnel include the user community/operator, key Pentagon staffers, contractors, the testers, and the PEO, to name a few. Another program manager commented, "The PM is always operating outside of his controlled environment. In fact, very seldom is a PM just huddled around with all the people just from his program office.

Another program manager ably summed it up by stating:

> The ability to develop successful working relationships with key players both within the PEO and outside of the PEO allows consensus building on complex/difficult issues which allows the program to progress. Without cooperation from the large number of people and organizations who make up the acquisition process no program will go forward.

g. Strategic Influence

This study defined *Strategic Influence* as: *Building coalitions with influential others and orchestrating situations to overcome obstacles and obtain support.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
7	22	10	7	2.308	0.863	54%

This competency had the seventh highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as one of the most important competencies. It also had the second largest sample standard deviation of 16 competencies included in the job competency model, indicating a smaller consensus regarding its relative importance. Strategic Influence was identified as "most important" by more than half (54%) and was ranked second by program managers, as needing further development through education or training.

The amount of Strategic Influence a program manager can exert in the interest of their program directly affects the external environment within which the program operates. One program manager defined Strategic Influence as, "having the ability to see a path to success and being able to establish the conditions that support achieving that success." Since program managers must rely on other key personnel to

resource the program (funding, personnel, etc.) their ability to influence those personnel is vital to program success.

Regarding the role of Strategic Influence, one program manager wrote:

> Army priorities and funding are not rational decision making exercises that support a single decision-maker. They are a result of multiple viewpoints and combined ideas embodied in General Officer working groups and councils of Colonels. Program managers have to work in this environment. No one else in the program can do this for the PM.

Another wrote:

> Team building goes beyond the Project Office, and extends to the other participants in your program – the headquarters staff, the senior leadership, the testers, the contractors, etc. The ability to meld these into a focused, energetic team makes the rest of the job much easier.

The program manager must be the advocate for his program to other agencies, forming a broad-based support team.

h. Results Oriented

Results Oriented was defined as: *Evaluating own and other's performance in terms of accomplishing specific goals or meeting specific standards.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
8	18	12	9	2.231	0.810	13%

This competency had the eighth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as one of the most important competencies.

Throughout the acquisition process program managers must move their program along from development toward fielding to the warfighters. It must achieve

established goals throughout the process. This allows the program office to focus on achieving an objective and measuring the accomplishment. A program manager amplified:

> Goal directed behavior, and the desire/ability to instill similar behavior in members of the PM shop [is vital]. Unless there is a clear definition of responsibility within each critical area, with specific cost, schedule, and performance requirements, then the PM has little hope of meeting his own cost, schedule, and performance requirements at the program level.

In short, a program manager must produce results to be successful.

i. Focus on Excellence

For the purposes of this study, Focus on Excellence was defined as: Striving to achieve the highest standards regardless of circumstances.

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
9	13	20	6	2.179	0.683	10%

This competency had the ninth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as one of the most important competencies. Additionally, it had the second smallest sample standard deviation of the 16 competencies included in the job competency model, indicating a larger consensus regarding its relative importance.

2. "Average Importance" Competencies

a. Collaborative Influence

This study defined *Collaborative Influence* as: *Modifying position to obtain the agreement and support of others in order to accomplish a shared goal or mission.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
10 (Tie)	17	11	11	2.154	0.844	33%

This competency had the tenth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider as an important competency to posses. Additionally, it had the third largest sample standard deviation of the 16 competencies included in the job competency model. This indicates less consensus regarding relative importance of Collaborative Influence. Importantly, Collaborative Influence was also identified by more than one third (33%) of the program managers as needing further development through education or training.

Because program management depends on interaction with so many organizations that often have competing objectives or agendas, the ability to collaborate with organizations external to the program office is important. The New Webster's Dictionary, Vest Pocket Edition, defines collaboration as "work together; cooperate with the enemy." A program manager must continuously make trade-off decisions, keeping an open and flexible mindset, in order to gain and maintain the support of the program's stakeholders. Talking about the importance of collaborating with the user community one program manager stated:

> Establishing a common vision with the customer is key to success to most programs.... You must have the flexibility to adapt to changing needs while focusing on an end goal that provides the functionality the soldier needs to do his job. Collaboration with the user is the only way to do this. Adopting rigid designs or approaching the user with an inflexible mindset will be counter-productive.

A program manager must maintain a constant and open dialog between the program office and external organizations, continuously negotiating to maintain program support.

b. Professional Expertise

Professional Expertise was defined by this study as seeing *self or being seen by others as a technical expert in one or more acquisition specialty areas.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
10 (Tie)	16	13	10	2.154	0.812	15%

This competency had the tenth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as an important competency to posses.

A program manager's personal professional expertise is key to his ability to effectively lead the program. He must understand the technical aspects of his program and the program management environment within which he operates. Possessing broad professional expertise builds a program manager's personal credibility, therefore promoting the program. One former program manager stated, "When a PM stands up and says something, the audience needs to believe that the PM is competent...and that he knows his program well enough to be talking about it ... It boils down to credibility." Another stated, "The key requirement for a PM is to know the program completely -

technically and programmatically - from the PM's and the combat user perspective." Similarly, another program manager stated, "Know your requirements inside and out. Read your contract and read your specifications. Know exactly where all of your funding is going."

Professional expertise builds the program manager's credibility and allows him to personally understand and lead the program, enabling him to make more informed decisions and recognize his limitations.

c. Coaches Others

This study defined *Coaches Others* as: *Providing others with performance feedback and suggestions to improve their capabilities.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
12 (Tie)	12	19	8	2.103	0.718	28%

This competency had the twelfth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as an important competency to posses.

The program manager must rely on the abilities of his program office staff to manage and execute to the program. Therefore, it is in the best interest of the program for the program manager to spend time and effort further developing his staff skills and abilities. Coaching subordinates is fundamental to being a good leader and program manager. One program manager stated:

> [Coaching] involves taking time to demonstrate critical characteristics real time, and pro-actively seeking opportunities for the "student" to apply what they have learned.... [It] is essential to the development of our next generation of leaders.

Another stated, "The PM has to set some reasonable and attainable priorities, nurture the team members, hold them accountable, and reward them for success." Program managers must actively pursue continuous improvement by investing in coaching their program office staff.

d. Creativity

In this study, *Creativity* was defined as: *Thinking up novel or unique ways to solve technical or administrative problems that others have difficulty solving.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
12 (Tie)	13	17	9	2.103	0.754	21%

This competency had the twelfth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as an important competency to possess. However, in general, program managers commented that they had difficulty distinguishing between the definitions of innovativeness and creativity. Both encompass being "open-minded," "thinking outside the box," and being willing to accept risk to do things a new way. The current acquisition reform environment facilitates creative thinking and strives to allow program managers to do what is efficient, makes sense, and accomplishes the desired end state.

e. Systematic Thinking

Operationally, *Systematic Thinking* was defined as: *Taking planned methodical approaches to organizing work and solving problems.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
14	11	20	8	2.077	0.703	36%

This competency had the fourteenth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as an important competency to possess. Significantly, Systematic Thinking was identified by more than one third (36%) of the program managers as a competency area needing further development through education or training.

The complexity of the defense systems acquisition process necessitates a comprehensive planning methodology. The planning horizon for a program manager is typically five years out due to the Planning Programming and Budgeting System (PPBS) currently used for resource allocation. The program manager must systematically and methodically analyze the program's current status and future requirements to facilitate management decisions. One program manager commented, "I have a complex, varied set of products with numerous customers. Systematic thinking is important to be able to assess what's important and to determine viable courses of action."

f. Critical Inquiry

This study defined *Critical Inquiry* as: *Exploring critical issues that are not explicitly addressed or recognized by others.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
15	13	15	11	2.051	0.793	36%

This competency had the fifteenth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as an important competency to possess. Importantly, Critical Inquiry was identified by more than one third (36%) of the program managers as a competency area needing further development through education or training.

Successful program management is reliant on obtaining the right, accurate information, at the appropriate time. Program managers must be able to identify what information is important, and determine its reliability. They must not accept data, decisions, or results at "face value." They must be able to intuitively identify key information that needs additional justification or explanation. As on program manager stated:

> In particular, I would identify a capability for sifting data, identifying problems, and making decisions to resolve key problems, one that German Generals called "fingerspitzengefuehl" (literally, fingertip feel) of the battlefield.

Program managers must continuously ask, "Why?" to gain further understanding of the underlying causes, motivations, and rationale behind information they are presented.

g. Managerial Orientation

Managerial Orientation was defined in this study as: *Seeing ones own role as getting work done through the efforts of others.*

Rank By Mean	Frequency			Sample Mean	Sample Standard Deviation	% of PM's Rated Needs Development
	Most Important	Important	Least Important			
16	12	16	11	2.026	0.778	26%

This competency had the sixteenth highest weighted sample mean of the 27 competencies analyzed, indicating that the 39 program managers surveyed consider it as an important competency to possess.

Two recurring themes emerged from the program manager's comments regarding managerial orientation: (1) developing a motivated and efficient team, and (2) delegation and empowerment. First, it is the program managers' responsibility to develop a program office that is a unified team focused on a single objective. One program manager wrote:

> It is critical to have an ability to build a cohesive, highly motivated team of professionals infused with a sense of vision and independence. A Project Manager is an amalgam of leader, manager, coach, cheerleader, and visionary. But, even the best vision and the best intentions cannot be effectively implemented without a highly motivated team; a team built on individual enthusiasm and commitment.

Another commented that it is important to have:

> ...small unit leadership (ability) and (the ability to) build high performing teams from professional workers. The program relies on getting the dedication, professional opinions, functional management, and interworking relationships between the 5-10 people you encounter every day. The PM has to set some reasonable and attainable priorities, nurture the team members, hold them accountable, and reward them for success.

Secondly, due to the enormous complexity of defense systems program management the program manager must rely heavily on the expertise, judgments, and decisions of his program office staff. One program manager stated, "You must realize,

you can't do everything yourself. People are your most precious asset!" Another stated that it is important for the program manager to have the "...ability to set the vision, goals, and agenda for the office and then delegate the execution. You can't do it all, see it all, or control it all. Trust your workers." This program manager summed the managerial orientation competency up nicely:

> In a nutshell, I think the best PM's are those that have a strategic vision, who understand they don't know it all, (who) get out of the "weeds," and (who) know how to get things done through teamwork.

F. COMPARISION OF FINDINGS TO PREVIOUS STUDIES

In this section, the findings of this study are compared to the results of the original DSMC study and the NPS-94 study. First, the final job competency models from each study are compared. Second, the relative importance of the competencies in each study is compared, specifically addressing competencies that exhibit a significant trend between the three studies. Finally, the competencies identified by program managers as needing further development in each study are compared. Table 16 presents the data on each competency obtained during each of the two studies.

1. Comparison of Job Competency Models

As discussed in Chapter II, both the DSMC and the NPS-94 study asked program managers which competencies they felt distinguished outstanding program managers from average ones. DSMC used a critical behavior interview technique and a survey. NPS used a survey and structured interviews. Based on the data collected, the program manager job competency model developed by each study is shown below in Table 17.

Table 16. Competency Analysis Historical Comparison

DSMC (N=128)				NPS (N=11)			Current Study (N=39)		
Rank Order By %	Competency	% PMs Rated Important	Converted Sample Mean	Rank Order By Mean	Competency	Sample Mean	Rank Order by Mean	Competency	Sample Mean
1	Sense of Ownership/ Mission	73%	2.46	1	Political Awareness	2.55	1	Long-term Perspective	2.564
2	Long-term Perspective	72%	2.44	2	Coaches Others	2.45	2	Innovativeness	2.487
3	Managerial Orientation	67%	2.34	3	Relationship Development	2.36	3	Political Awareness	2.436
4	Political Awareness	62%	2.24	3	Results Oriented	2.36	4	Sense of Ownership/ Mission	2.410
5	Optimizing	60%	2.20	3	Innovativeness	2.36	5	Relationship Development	2.333
6	Results Orientation	57%	2.14	3	Self Control	2.36	5	Action Oriented	2.333
7	Innovativeness/Initiative	55%	2.10	7	Sense of Ownership/Mission	2.27	7	Strategic Influence	2.308
7	Systematic Thinking	55%	2.10	7	Long-term Perspective	2.27	8	Results Oriented	2.231
9	Focus on Excellence	50%	2.00	9	Managerial Orientation	2.18	9	Focus on Excellence	2.179
10	Relationship Development	48%	1.96	9	Action Oriented	2.18	10	Collaborative Influence	2.154
10	Action Orientation	48%	1.96	9	Positive Expectations	2.18	10	Professional Expertise	2.154
12	Coaches Others	47%	1.94	9	Creativity	2.18	12	Coaches Others	2.103
3	Proactive Info Gathering	45%	1.90	13	Strategic Influence	2.09	12	Creativity	2.103
13	Strategic Influence	45%	1.90	13	Critical Inquiry	2.09	14	Systematic Thinking	2.077
15	Creativity	44%	1.88	13	Focus on Excellence	2.09	15	Critical Inquiry	2.051

Table 16 (Continued)

DSMC (N=128)				NPS (N=11)			Current Study (N=39)		
16	Self Control	43%	1.86	13	Professionalism	2.09	16	Managerial Orientation	2.026
17	Interpersonal Assessment	42%	1.84	17	Proactive Info Gathering	2.00	17	Interpersonal Assessment	1.872
18	Collaborative Influence	40%	1.80	17	Systematic Thinking	2.00	18	Proactive Info Gathering	1.846
18	Critical Inquiry	40%	1.80	17	Interpersonal Sensitivity	2.00	18	Positive Expectations	1.846
20	Positive Expectations	38%	1.76	20	Interpersonal Assessment	1.81	20	Optimizing	1.821
21	Professionalism	34%	1.68	21	Optimizing	1.63	20	Self Control	1.821
22	Interpersonal Sensitivity	29%	1.58	21	Attention to Detail	1.63	22	Attention to Detail	1.718
23	Attention to Detail	28%	1.56	23	Assertiveness	1.54	23	Efficiency Orientation	1.564
24	Assertiveness	27%	1.54	23	Collaborative Influence	1.54	24	Interpersonal Sensitivity	1.513
25	Efficiency Orientation	24%	1.48	25	Efficiency Orientation	1.36	24	Assertiveness	1.513
26	Directive Influence	22%	1.44	26	Competitiveness	1.27	26	Directive Influence	1.385
27	Competitiveness	11%	1.22	27	Directive Influence	1.09	27	Competitiveness	1.179

Table 17. Job Competency Model Comparison

DSMC Model	NPS – 94 Model	NPS – 99 Model
Managing the External Envt Sense of Ownership/Mission* Political Awareness* Relationship Development* Strategic Influence* Interpersonal Assessment* Assertiveness	**Managing the External Envt** Sense of Ownership/Mission Political Awareness Relationship Development* Strategic Influence Interpersonal Assessment*	**Managing the External Envt** Sense of Ownership/Mission* Political Awareness* Relationship Development* Strategic Influence* Collaborative Influence
Managing the Internal Envt Managerial Orientation Results Orientation Critical Inquiry	**Managing the Internal Envt** Managerial Orientation Results Oriented* Critical Inquiry	**Managing the Internal Envt** Managerial Orientation Results Oriented* Critical Inquiry Professional Expertise
Managing for Enhanced Performance Long-Term Perspective Focus on Excellence Innovativeness/Initiative Optimizing Systematic Thinking	**Managing for Enhanced Performance** Long-Term Perspective Focus on Excellence Innovativeness Systematic Thinking Self Control* Coaches Others*	**Managing for Enhanced Performance** Long-Term Perspective* Focus on Excellence* Innovativeness* Systematic Thinking Coaches Others Creativity
Proactivity Action Orientation* Proactive Information Gathering	**Proactivity** Action Oriented Proactive Information Gathering	**Proactivity** Action Oriented*

* Indicates "most important" competencies for outstanding program managers

When comparing these job competency models to one another, it is important to realize that, although the sample populations of program managers were similar, there are differences that may have directly affected the research outcomes. These differences may limit the ability to directly compare the models:

- The DSMC research included 128 "average" and "outstanding" program managers from all branches of the military, and from programs of all sizes.
- The NPS-94 research included 25 "average" and "outstanding" Army ACAT I(C/D) program managers.
- This study sampled 39 "outstanding" Army program managers from programs of all sizes.

With this in mind, comparison of the program manager job competency model developed in this study to the previous competency models show:

- General
  - Each model identified 16 of the 27 researched competencies as important for DOD program managers.
  - The DSMC model identified six competencies as distinguishing outstanding program managers from average ones; the NPS-94 model identified five; this study identified nine.
- Competencies included in the Model
  - Twelve of the 16 competencies included in this study's model were also in the original DSMC model. These 12 competencies were considered as "most important" or "important" by the program managers surveyed. Those in the DSMC model, but not in this model, are: Interpersonnel Assessment, Assertiveness, Optimizing, and Proactive Information Gathering.
  - Thirteen of the 16 competencies included in this study's model were also in the NPS-94 model. Those in the NPS-94 model, but not in this model, are: Interpersonnel Assessment, Self-control, and Proactive Information Gathering.
- Competencies of Outstanding Program Managers
  - Five of the six competencies identified by the DSMC study to be demonstrated significantly more often by outstanding program managers were identified in this study as competencies that are "most important" for program managers to possess. The only one not included in this study is Assertiveness. Additionally, three other competencies were identified as "most important" by this study: Long-term Perspective, Focus on Excellence and Innovativeness.
  - Only two of the five competencies identified by the NPS - 94 study as distinguishing outstanding program managers from average ones were identified in this study as competencies that are "most important" for program managers to possess. They were Relationship Development and Results Oriented.

In general, this comparison indicates that the task domain, "Managing the External Environment," continues to be vital to the success of today's program managers. Five of the six (83%) competencies identified as distinguishing outstanding program managers in the DSMC study were in this task domain. Two of the five in the NPS-94 study were in this domain. Four of the nine (44%) competencies identified as "most important" by this study are in this task domain, more than in any other single task domain.

2. Competency Importance Comparison

In this section the relative importance of the competencies (based on the sample mean) in each study are compared, specifically addressing competencies that exhibit a significant trend between the three studies. Table 16 listed the sample mean for each competency in each of the studies. Competencies are rank ordered based on the their sample mean within each study.

There are several limitations to this comparison that must be recognized before comparison. First, the limitations discussed when comparing the job competency models above are still applicable. Second, both of the previous studies used interviews and surveys to determine which competencies program managers felt distinguished outstanding program managers from average ones. For the purposes of this section, only the survey results from each of the studies are compared, since this research did not include interviews with program managers.

Third, from the NPS-94 study, only the survey data from the 11 "outstanding" program managers is used. The survey results from the other 14 "average" program managers were not used since this study compared the data obtained from "outstanding

program managers." With such a small sample size (n=11), the value of comparing the mean of individual competencies from the NPS-94 study to the results of the DSMC or this study is considered limited. The confidence interval (at a 95% and above level of confidence) for each competency is so broad that it is difficult to make statistical inferences regarding the population mean.

Finally, only the mean weighted values of each competency from each study are compared. The sample variance and estimated confidence intervals from each study are not considered. If these factors were considered, the researcher may have found that the below-identified trends (across the studies) may not be statistically significant or credible with any reasonable level of confidence.

By comparing the sample mean for each competency across all three studies, three primary trends were observed: (1) increasing relative importance (See Figure 5); (2) decreasing relative importance (See Figure 6); and (3) stable relative importance (See Figure 7).

a. Increasing Relative Importance ("the upstarts")

(1) **Professional Expertise.** The relative importance of Professional Expertise increased by 23.7% since the DSMC study was conducted. This was the largest increase in relative importance of the 27 competencies analyzed. The NPS-94 study is consistent with this finding.

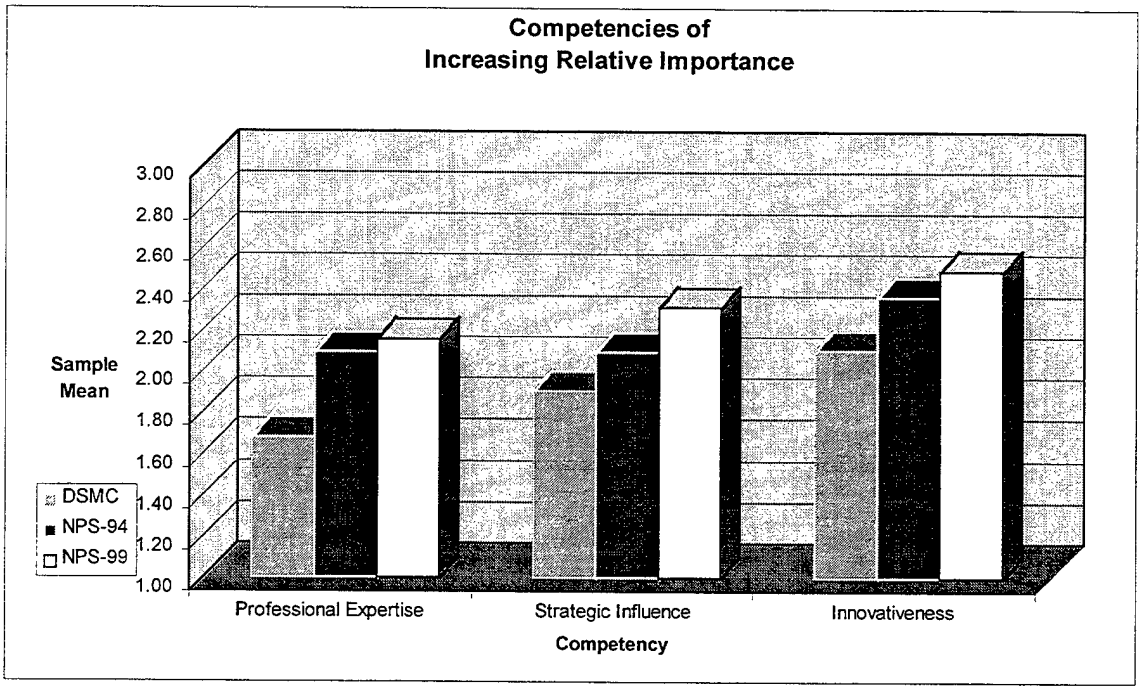


Figure 5. Competencies of Increasing Relative Importance

Professional Expertise, a control competency in the original DSMC study, ranked 21st overall in that study, 13th in the NPS-94 study, and 10th in this study. It was not in either of the previous job competency models, but is included in this study's model. This increase in the perceived relative importance of Professional Expertise may be attributable to several factors. First, although the definition remained unchanged, the competency title for "Professional Expertise" in the previous two studies was "Professionalism." It was changed to "Professional Expertise" in this study as recommended in the NPS-94 study. The title change itself may have influenced the program managers. Secondly, the increased importance may indicate that program managers must be more technically proficient in acquisition to be seen as an outstanding program manager. The dramatic downsizing of the Acquisition Corps and continued

implementation of acquisition reform initiatives may also require program managers to be more technically proficient in this highly competitive and dynamic environment.

(2) **Strategic Influence.** The relative importance of Strategic Influence increased by 20.4% since the DSMC study was conducted. This was the second largest increase in relative importance of the 27 competencies analyzed. The NPS-94 study is consistent with this finding.

Strategic Influence was included in the original DSMC model and was identified as a competency that distinguishes outstanding program managers. It was also included in the NPS-94 model but was not identified as a competency that distinguishes outstanding program managers. It was ranked 13th overall in the DSMC study, 13th in the NPS-94 study, and 7th in this study. Additionally, it was identified as a "most important" competency in this study's model. This apparent increase in the relative importance of Strategic Influence may also be related to the increasingly competitive DOD acquisition environment. Program managers must be more effective today at influencing those in the system to support them.

(3) **Innovativeness.** The relative importance of Innovativeness increased by 19.4% since the DSMC study was conducted. This was the third largest increase in relative importance of the 27 competencies analyzed. The NPS-94 study is consistent with this finding.

Innovativeness was included in both the DSMC model and the NPS-94 model. It, however, was not identified in either of those as a competency that distinguishes outstanding program managers. It was ranked seventh overall in the DSMC study, third in the NPS-94 study, and second in this study. Additionally, it was identified

as a "most important" competency in this study's model. The increase in the relative importance of Innovativeness can most likely be attributed to acquisition reform. In today's acquisition environment, program managers are encouraged to develop and implement new approaches and accept necessary calculated risks for their program's success.

b. Decreasing Relative Importance ("the loss of the halo")

(1) **Optimizing.** The relative importance of Optimizing decreased by 19.0% since the DSMC study was conducted. This was the largest decrease in relative importance of the 27 competencies analyzed. The NPS-94 study is consistent with this finding, reflecting an even larger decrease in 1994.

Optimizing was included in the DSMC model but was not identified as a competency that distinguishes outstanding program managers. It was not included in the NPS-94 model or this study's model. It was ranked fifth overall in the DSMC study, 21st in the NPS-94 study, and 20th in this study. The decrease in the relative importance of Optimizing may be attributable to the current acquisition reform environment since it may be viewed by today's program managers as being a more traditional managerial skill. Optimization may be viewed as nearly impossible since the entire acquisition system is always changing so rapidly.

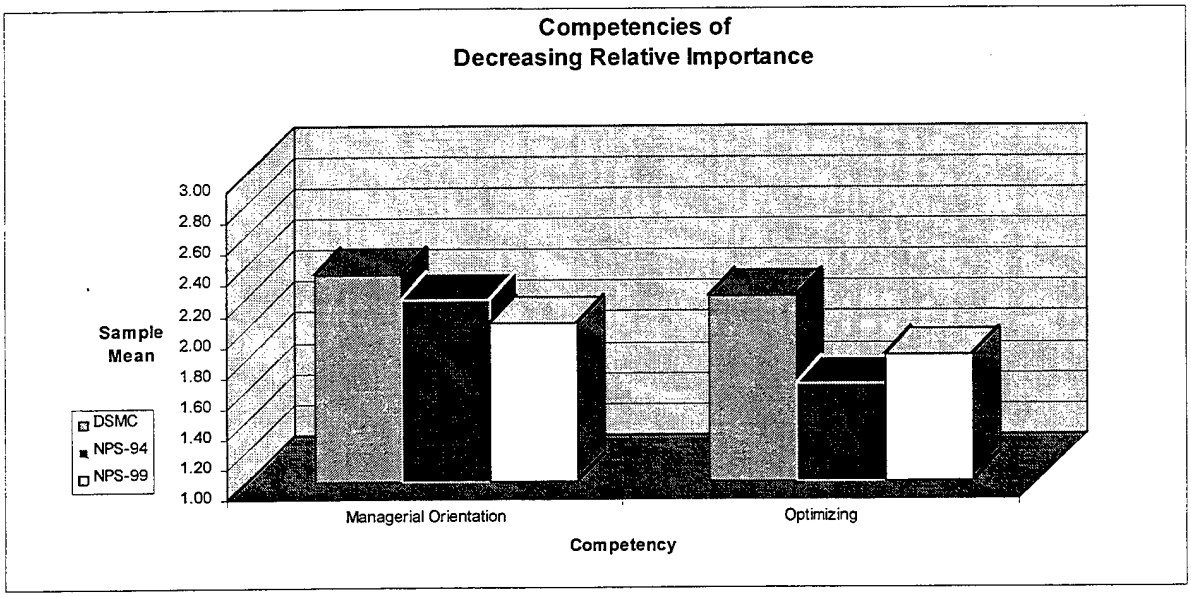


Figure 6. Competencies of Decreasing Relative Importance

(2) **Managerial Orientation.** The relative importance of Managerial Orientation decreased by 15.7% since the DSMC study was conducted. This was the second largest decrease in relative importance of the 27 competencies analyzed. The NPS-94 study is consistent with this finding. This apparent decrease in the relative importance of Managerial Orientation is also probably a result of acquisition reform. It may also seem to be a more traditional managerial skill to program managers; less applicable in today's Integrated Process and Product Development/Integrated Product Team (IPPD/IPT) and empowered team environment.

Managerial Orientation was included in all three of the job competency models as an important competency for program managers to possess. It, however, was not identified as a competency that distinguishes outstanding program managers in any of the models. It was ranked third overall in the DSMC study, ninth in the NPS-94 study, and 16th in this study.

c. *Stable Relative Importance*

(1) **Systematic Thinking.** The relative importance of Systematic Thinking remained fairly constant since the DSMC study was conducted; it's sample mean varying by only 1.15%. This was the most stable sample mean value of the 27 competencies analyzed. The NPS-94 study is consistent with this finding.

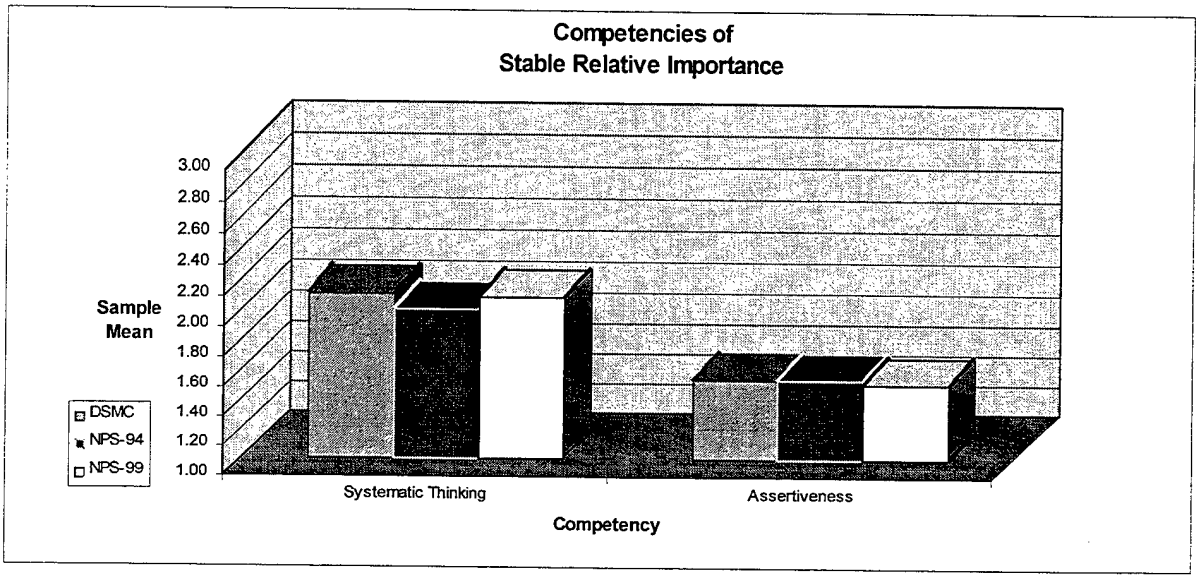


Figure 7. Competencies of Relatively Stable Importance

Systematic Thinking was included in all three of the job competency models as an important competency for program managers to possess. It, however, was not identified as a competency that distinguishes outstanding program managers in any of the models. It was ranked seventh overall in the DSMC study, 17th in the NPS-94 study, and 14th in this study.

(2) **Assertiveness.** The relative importance of Assertiveness also remained fairly constant since the DSMC study was conducted; it's sample mean varying by only 1.4%. This was the second most stable sample mean value of the 27 competencies analyzed. The NPS-94 study is consistent with this finding. Assertiveness

was only included in the original DSMC model, but was not identified as a competency that distinguishes outstanding program managers. It was ranked 24th overall in the DSMC study, 23rd in the NPS-94 study, and 24th in this study.

When comparing the three studies, it should be noted that seven of the nine competencies identified as "most important" in this study were ranked no lower than 10th in any of the studies. One of the other two, Strategic Influence, was ranked 13th twice. The other, Focus on Excellence, was ranked 13th once. The other three times they were analyzed, they were both ranked in the top nine competencies. Only one of the five competencies identified as "least important" was ranked above 23rd out of the 27 competencies analyzed in any of the studies. Interpersonal Sensitivity, was ranked 22nd, 17th, and 24th respectively. Finally, although categorized by this study as a competency of "average importance," Attention to Detail was also consistently had a low sample mean, ranking 23rd, 21st, and 22nd respectively.

A comparison of each competency across all three studies is shown in Appendix G.

3. Comparison of Competencies Needing Development

As discussed in Chapter II, both the DSMC and the NPS-94 study asked program managers to identify competencies that they felt needed further development. They were to be competencies that they thought additional education and training programs would benefit the greatest number of program managers.

The DSMC survey, however, provided minimal information in this area. Due to the wording and format of the survey question regarding competencies needing development very few program managers responded to this question. DSMC concluded

that the usefulness of their results was very limited. DSMC's data is included only for reference purposes and cannot be considered when comparing study results.

The NPS-94 study used the recommendations of DSMC to reword and restructure the competency development question in order to generate accurate and usable data. It required each of the 25 program managers surveyed to identify six of the 27 competencies that they felt needed further development. The proportion of program managers that identified a competency as needing development was calculated in both the NPS-94 study and this study. (See Table 18) By comparing the proportion obtained by this study against the NPS-94 study, several trends became evident.

First, the most significant finding entailed Political Awareness. Program managers in both of the NPS studies identified Political Awareness as the number one competency area needing development. Sixty percent of the NPS-94 survey respondents, and 64% of this study's program managers identified Political Awareness, ten percentage points ahead of the next developmental area.

Second, three of the six competencies identified by more than one-third of the program managers in this study, were also identified by the NPS-94 study as needing improvement: Political Awareness, Long-term Perspective, and Critical Inquiry. Third, six others were identified by at least 25% of the survey respondents in both studies as needing development: Strategic Influence, Systematic Thinking, Collaborative Influence, Innovativeness, Coaches Others, and Managerial Orientation.

Finally, three primary trends regarding competencies needing development are evident: (1) increased perceived need for competency development; (2) decreased need for competency development; and (3) stable perceived need for competency development. (See Figure 8)

Table 18. Competency Developmental Needs Comparison

DSMC (N=128)			*NPS (N=11)*			*Current Study (N=39)*		
Rank Order By %*	*Competency*	*% PMs Rated Needs Develop.*	*Rank* Order By %*	*Competency*	*% PMs Rated Needs Develop.*	*Rank* Order By %*	*Competency*	*% PMs Rated Needs Develop.*
1	Interpersonal Assessment	22%	1	Political Awareness	60%	1	Political Awareness	64%
2	Systematic Thinking	19%	2	Critical Inquiry	40%	2	Strategic Influence	54%
3	Managerial Orientation	16%	3	Long-term Perspective	36%	3	Long-term Perspective	36%
4	Long-term Perspective	15%	4	Innovativeness	36%	3	Systematic Thinking	36%
4	Political Awareness	15%	4	Managerial Orientation	32%	3	Critical Inquiry	36%
4	Optimizing	15%	4	Strategic Influence	32%	6	Collaborative Influence	33%
4	Relationship Development	15%	4	Coaches Others	32%	7	Relationship Development	31%
4	Proactive Info Gathering	15%	4	Creativity	32%	7	Interpersonal Assessment	31%
9	Strategic Influence	13%	9	Systematic Thinking	28%	7	Efficiency Orientation	31%
10	Results Orientation	12%	10	Collaborative Influence	28%	10	Innovativeness	28%
10	Collaborative Influence	12%	10	Interpersonal Sensitivity	28%	10	Coaches Others	28%
12	Innovativeness/Initiative	11%	12	Proactive Info Gathering	24%	12	Managerial Orientation	26%
12	Assertiveness	11%	12	Professionalism	24%	13	Proactive Info Gathering	21%
14	Action Orientation	5%	14	Interpersonal Assessment	20%	13	Creativity	21%
15	Sense of Ownership/ Mission	4%	15	Optimizing	20%	15	Self Control	15%
15	Focus on Excellence	4%	15	Relationship Development	20%	15	Professional Expertise	15%

Table 18 (Continued)

DSMC (N=128)			*NPS (N=11)*			*Current Study (N=39)*		
16	Coaches Others	0%	16	Focus on Excellence	20%	15	Interpersonal Sensitivity	15%
16	Creativity	0%	16	Efficiency Orientation	16%	18	Sense of Ownership/Mission	13%
16	Self Control	0%	16	Action Oriented	12%	18	Optimizing	13%
16	Critical Inquiry	0%	16	Results Orientation	8%	18	Results Oriented	13%
16	Positive Expectations	0%	16	Sense of Ownership/ Mission	8%	21	Focus on Excellence	10%
16	Professionalism	0%	16	Self Control	8%	21	Positive Expectations	10%
16	Interpersonal Sensitivity	0%	16	Attention to Detail	8%	23	Action Oriented	8%
16	Attention to Detail	0%	16	Assertiveness	4%	23	Assertiveness	8%
16	Efficiency Orientation	0%	16	Positive Expectations	4%	25	Attention to Detail	5%
16	Directive Influence	0%	16	Directive Influence	0%	25	Directive Influence	5%
16	Competitiveness	0%	16	Competitiveness	0%	27	Competitiveness	0%

*Identical numbers denote tie sample mean values

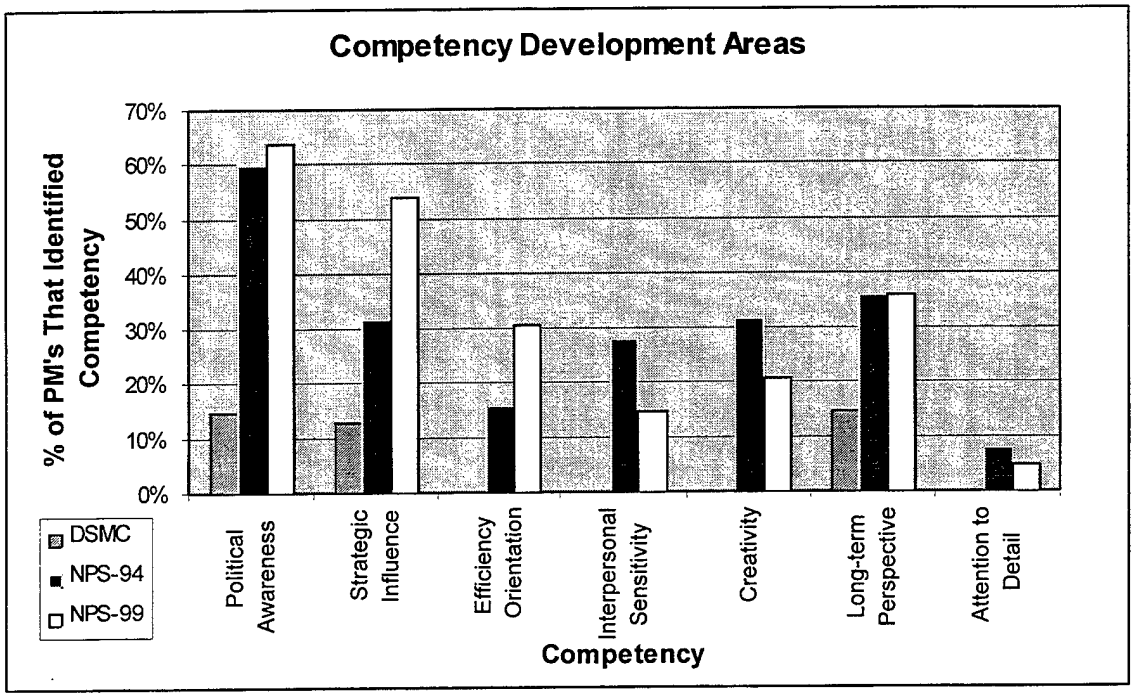


Figure 8. Competency Development Areas

a. ***Increased Perceived Need for Competency Development***

(1) **Strategic Influence.** The perceived need for additional develop-ment in the area of Strategic Influence increased by 22%, from 32% to 54%, since the NPS-94 study. This is by far the largest increase in perceived development need of the 27 competencies.

(2) **Efficiency Orientation.** The perceived need for additional development in the area of Efficiency Orientation increased by 15%, from 16% to 31%, since the NPS-94 study. This is the second largest increase in perceived development need of the 27 competencies.

b. Decreased Perceived Need for Competency Development

(1) **Interpersonal Sensitivity.** The perceived need for additional development in the area of Interpersonal Sensitivity decreased by 13%, from 28% to 15%, since the NPS-94 study. This is the largest decrease in perceived development need out of the 27 competencies.

(2) **Creativity.** The perceived need for additional development in the area of Creativity decreased by 11%, from 32% to 21%, since the NPS-94 study. This is the second largest decrease in perceived development need out of the 27 competencies.

c. Stable Perceived Need for Competency Development

(1) **Long-Term Perspective.** The perceived need for additional development in the area of Long-term Perspective remained the same at 36%. This is the only competency out of the 27 that received identical ratings between the two NPS studies.

(2) **Attention to Detail.** The perceived need for additional development in the area of Attention to Detail only dropped by 3%, from 8% to 5%, since the NPS-94 study. This is the second smallest decrease in perceived development need out of the 27 competencies.

Competency development rating comparison for each competency is in Appendix H.

G. CHAPTER SUMMARY

The data obtained from 39 outstanding Army program managers by the Program Manager Competency Survey revealed several key points of interest.

First, although the original DSMC Job Competency Model and the follow-on NPS-94 Job Competency Model are still relatively valid, this revised Program Manager Job Competency Model provides current insight into the competencies are important for program managers to possess in *today's* DOD acquisition environment.

Second, many of the competencies that distinguished outstanding program managers in the DSMC and NPS-94 studies are just as important today, a decade later; most notably Long-term Perspective, Innovativeness, Political Awareness, and Sense of Ownership/Mission.

Third, several competencies have become significantly more important for program managers to possess, including Professional Expertise, Strategic Influence, and Innovativeness. This may be directly attributable to an increasingly competitive acquisition environment (due to downsizing, reduced procurement funding, etc.) and the implementation of acquisition reform initiatives.

Fourth, in general the competencies identified in this study as being the least important for outstanding program managers to exhibit in today's procurement environment were also determined to be the relatively least important in the previous studies. They are Competitiveness, Directive Influence, Assertiveness, Interpersonal Sensitivity, and Efficiency Orientation.

Finally, three of the competencies identified by this study as being most important for program managers to possess (Long-term Perspective, Political Awareness, and Strategic Influence) were also identified as competency areas needing further development through educational programs or training. Political Awareness was identified in both this study and the NPS-94 study as being the number one competency

area needing development. Long-term Perspective was identified third in both studies as needing further development.

V. CONCLUSIONS AND RECOMMENDATIONS

> The mark of a true leader (which is what a PM is first and foremost) is the ability to get ordinary people to perform extraordinary feats under less than optimal circumstances. A Program Manager

A. OVERVIEW

Program management in today's highly dynamic, complex, demanding, and competitive DOD acquisition environment is extremely challenging. Program managers must be equipped with many unique technical project management "tools" and skills to successfully manage the acquisition of a weapon system. However, program success is also a function of the program manager's personal leadership capability. This research sought to identify those characteristics which are most critical for today's DOD weapon system program managers to possess to be successful.

To accomplish this, follow-on research to a 1990 DSMC and a 1994 NPS study was conducted. Both of these previous studies also identified which personal characteristics, or competencies, distinguish outstanding program managers. In each of these studies DOD program managers were interviewed and surveyed in order to develop Program Manager Job Competency Models. In general, the results of the DSMC and NPS studies were similar with many of the same competencies were identified as critical.

However, many significant changes have occurred in the DOD acquisition environment since these studies were conducted (i.e., DAWIA, FASA, DOD 5000 Update, etc.). Although these changes do not invalidate the previous studies, the Program Manager Job Competency Model needed to be reassessed to determine if the competencies required to be a successful program manager have changed. Given this

objective, this study used the DSMC competency model as a baseline and a similar research methodology to analyze the same 27 competencies. This facilitated development of a revised Program Manager Job Competency Model, and direct comparison with the two previous studies to identify significant competency trends. This research provides the Acquisition Corps and future program managers with current insight into the competencies required for successful program management in DOD.

B. CONCLUSIONS

1. General Conclusions

This study, by surveying 39 "outstanding" Army program managers, conducting statistical analysis of the data, and analyzing over 200 free-form responses to survey questions, has identified nine competencies as "most important" for today's outstanding DOD program managers to possess. (See 2a below). This study also identifies several key competency trends by comparing its results to the previous studies. (See 2b below) In addition, several key competency areas are identified as needing additional development. (See 2c below) Finally, a revised competency model was developed containing 16 competencies, including the nine identified as "most important." (See 2d below) Competencies, ranked by their relative importance, are shown in Figure 9 below.

2. Specific Conclusions

a. Today's Most Important Program Manager Competencies

This study addressed the primary research question: *What competencies are most critical to be an outstanding Army Program Manager?*

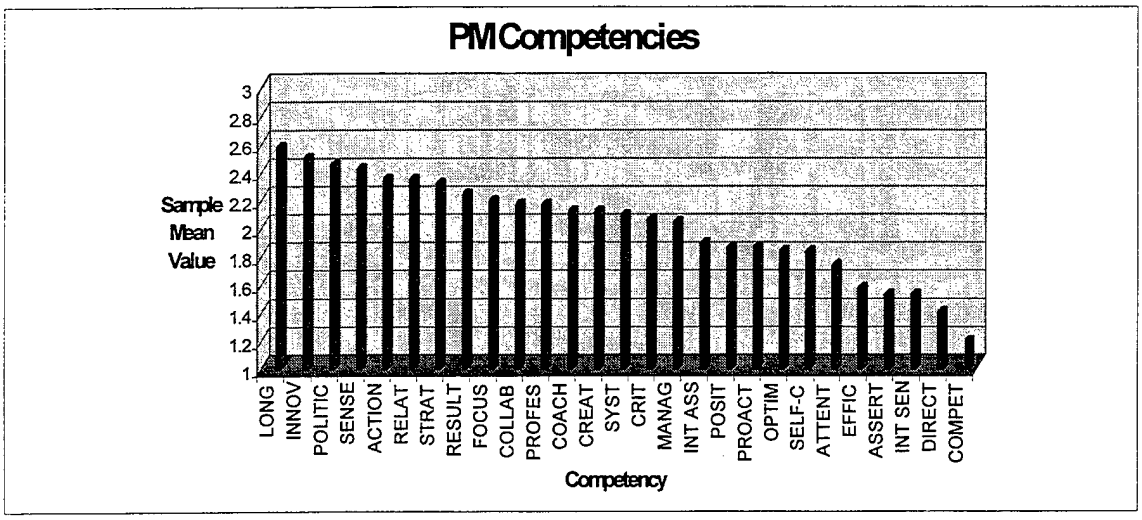


Figure 9. Program Manager Competencies Mean Interval Scale

Based on mean value analysis and confidence interval analysis of program manager responses for each competency, nine of the 16 competencies included in the revised Program Manager Job Competency Model are identified as "most important." They are, in order of relative importance:

- Long Term Perspective
- Innovativeness
- Political Awareness
- Sense of Ownership / Mission
- Relationship Development
- Action Oriented
- Strategic Influence
- Results Oriented
- Focus on Excellence

These are the nine competencies that are most important for a program manager to possess and that distinguish outstanding program managers in today's complex DOD acquisition environment

b. Program Manager Competencies Needing Further Development

This study addressed the secondary research question: *What program manager competencies need additional development through education and training programs?*

Most significantly, the competency Political Awareness was identified by an overwhelming majority (64%) of today's outstanding program managers as needing additional development. It was also identified as such by 60% of the program managers in the NPS-94 study. These consistent findings indicate that today's Army program managers continue to feel that the political dimension of program management is not adequately addressed by the education and training programs currently available to them.

Also of interest, the competency Strategic Influence was identified by 54% of the program managers as needing additional development, a 22% increase (the largest increase of the 27 competencies) since the NPS-94 study. This indicates that there is a significantly larger perceived need for additional education and training in this area today than five years ago; the reason why cannot be determined from the data collected and could only be speculated.

Two other competencies were also identified by more than one-third (33%) of the program managers in both the NPS-94 and this study: Long-term Perspective, and Critical Inquiry.

These findings are graphically illustrated in Figure 10.

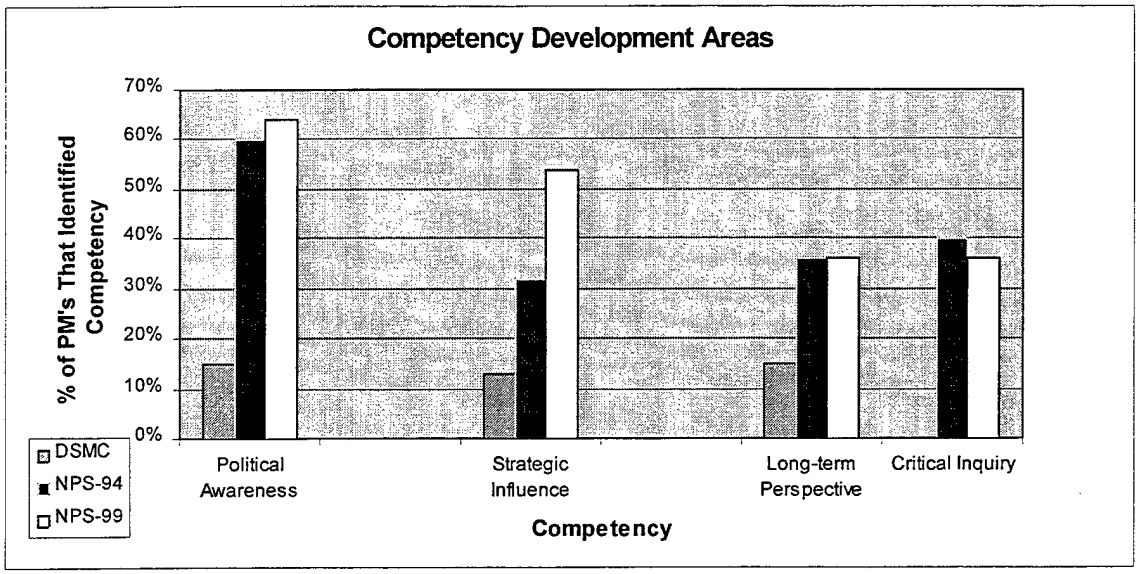


Figure 10. Competency Development Areas

Additionally, three of the four competencies identified above as needing further development (Political Awareness, Strategic Influence, and Long-term Perspective) were also identified as "most important" for program managers to possess. This indicates that without adequate development, these competencies may be an Achilles heel for a program manager, and perhaps for a program's success.

c. Program Manager Competency Trends over the Last Decade

Secondary Research Question: *Have the competencies required for an outstanding Army program manager changed over the past decade?*

These findings are graphically illustrated in Figure 11.

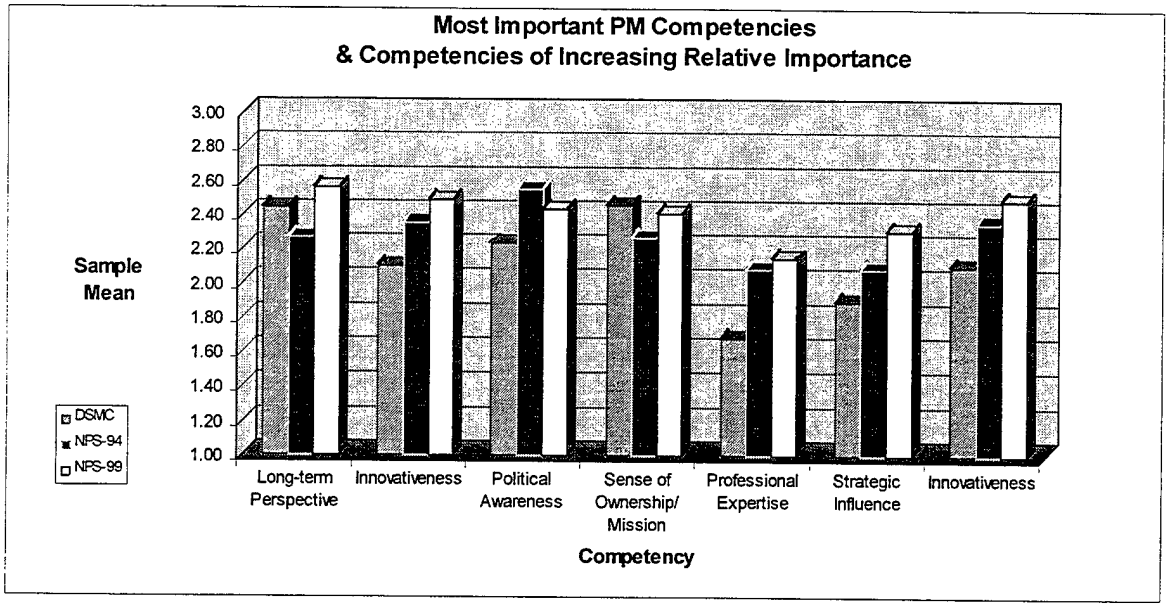


Figure 11. Most Important PM Competencies & Competencies of Increasing Relative Importance

First, several competencies have become significantly more important for program managers to possess since the DSMC study, including Professional Expertise, Strategic Influence, and Innovativeness. This may be directly attributable to an increasingly competitive DOD acquisition environment and implementation of acquisition reform initiatives. Second, many of the competencies that distinguished outstanding program managers in the DSMC and NPS-94 studies are just as important today, a decade later; most notably, Long-term Perspective, Innovativeness, Political Awareness, and Sense of Ownership/Mission. Third, the competencies of Competitiveness, Directive Influence, Assertiveness, Interpersonal Sensitivity, and Efficiency Orientation were determined to be relatively less important in all three studies.

d. Current Validity of the DSMC and NPS-94 Competency Models

Secondary Research Question: *To what extent are the DSMC and NPS-94 Program Manager Competency Models valid for current Army program managers?*

Although the original DSMC Job Competency Model and the follow-on NPS-94 Job Competency Model are still relatively valid, the revised Program Manager Job Competency Model presented in this study provides current insight into the competencies that are important for program managers to possess in today's DOD acquisition environment. The revised program manager's job competency model is presented in Table 19 below.

Table 19. Revised Program Manager Job Competency Model

Managing the External Environment	***Managing for Enhanced Performance***
1. Political Awareness * 2. Sense of Ownership / Mission* 3. Relationship Development* 4. Strategic Influence*	10. Long-Term Perspective* 11. Innovativeness* 12. Focus on Excellence* 13. Creativity 14. Coaches Others 15. Systematic Thinking
Managing the Internal Enviornment	***Proactivity***
5. Results Oriented* 6. Collaborative Influence 7. Professional Expertise 8. Critical Inquiry 9. Managerial Orientation	16. Action Oriented*

* Indicates "most important" competencies for outstanding program managers to possess.

Mastery of the program management task domain, "Managing the External Environment," continues to be vital to the success of today's program managers, as was determined in the previous two studies. Four of the nine (44%) competencies

identified as "most important" by this study are in this task domain, more than in any other single task domain.

Several competencies that had been included in one or both of the previous competency models were not included in this revised model, due to an apparent drop in that competency's relative importance. They are Interpersonal Assessment, Assertiveness, Optimizing, Self-control, and Proactive Information Gathering. In contrast, several competencies apparently increased in relative importance since the previous studies and were added to the revised model. They are Collaborative Influence, Professional Expertise, and Creativity.

Therefore, based on the data obtained from a representative group of outstanding Army program managers, the 16 competencies contained in this revised Program Manager Job Competency Model (See Table 19) are important (nine of which have been identified as the most important) for program managers to possess in today's DOD acquisition environment.

C. RECOMMENDATIONS

Based on these findings, several recommendations are presented that would enhance the DOD acquisition workforce through the competency development of future program managers.

1. Reassessment of Existing DAU School Curriculums

Based on the study's findings, the Defense Acquisition University (DAU) schools should consider a reassessment of their curriculums, including DSMC's Advanced Program Management Course (PMT302) and NPS's Systems Acquisition Management curriculum, to ensure that the competencies required of successful DOD program

managers are being adequately addressed. Priority might be placed on competencies identified as needing further development. If these competencies are not adequately addressed, they should modify their current curriculums or develop a combination leadership/management course that specifically addresses these competencies, perhaps using a case study analysis technique to gain additional insight into the role of each competency.

2. DOD Program Manager Internship Program

In order to give future program managers an appreciation of a program manager's daily routine, his work environment, and the importance of these key competencies in his program manager responsibilities, the Florida Institute of Technology, the Naval Postgraduate School, and the Air Force Institute of Technology, should incorporate a four to six week program management office internship into their graduate level program management curriculums. This internship would allow the student (a potential future program manager) to "shadow" a current program manager/deputy program manager, providing him with first-hand observation of the program manager's competencies in action.

The internship could be similar to the "experience tour" currently offered to most students at NPS. It could be facilitated by offering a condensed course load for half of quarter, with the student on his internship, at the program management office, the other half of the quarter. Such an internship would provide the aspiring program manager with a professional development opportunity not currently offered in the DOD Acquisition Corps.

3. Acquisition Community Awareness

Finally, to propagate these updated competency findings throughout the acquisition community, a summary of this study's findings should be published in a DOD professional journal/acquisition publication. Its findings could also be published to an Internet site, providing instant worldwide access to acquisition professionals. This would provide a timely, community-wide update on the program manager competencies.

D. LIMITATIONS OF THIS RESEARCH

First, as discussed in Chapter IV, the comparability of this study's findings to the DSMC and NPS research is limited in several ways. Because of this study's relative scope, only surveying outstanding Army program managers, comparability may be affected since DSMC results are from program managers from all the services. Additionally, the NPS-94 study only sampled Army ACAT I(C/D) program managers. Both this study and the DSMC study sampled program managers from programs of all sizes. Although, the DOD-wide DSMC research concluded that branch of service or size of program had no affect on the competency findings, this study's findings may, in fact, be biased by service related conditions or confounding variables.

Finally, only 11 outstanding program managers were surveyed and interviewed in the NPS-94 study. With such a small sample size (n=11), the value of comparing the mean of individual competencies from the NPS-94 study to the results of the DSMC or this study is considered limited because of a resulting low statistical confidence level. While these limitations do not invalidate this study, they should be considered when using the data or findings as a basis for implementation of any recommendations.

E. AREAS OF FURTHER RESEARCH

While this study identified which competencies are most important for today's program managers to possess, it does not attempt to address why they are critical or why their relative importance has changed over the last decade. Future research could analyze the data from each of these studies, looking at the DOD acquisition environment during each study, including legislation, reform initiatives, resource constraints, and educational/ training program available, to determine, "Why?" This could provide further insight into why those competencies were important at that time.

Second, in support of the above recommendation, future research could reassess the current program management curriculums of the DAU schools to ensure that the competencies required of successful DOD program managers are being adequately addressed, especially competencies identified as needing further development.

APPENDIX A. NPS-94 COMPETENCY SURVEY RESULTS

NPS SUCCESSFUL PM COMPETENCY ANALYSIS

Rank Order By Mean	*Competency*	*Mean (n=11)*	*Sample Standard Deviation*
1	Political Awareness	2.55	.688
2	Coaches Others	2.45	.688
3 (Tie)	Relationship Development	2.36	.809
3 (Tie)	Results Oriented	2.36	.688
3 (Tie)	Innovativeness	2.36	.674
3 (Tie)	Self Control	2.36	.809
7 (Tie)	Sense of Ownership/Mission	2.27	1.009
7 (Tie)	Long-term Perspective	2.27	.647
9 (Tie)	Managerial Orientation	2.18	.874
9 (Tie)	Action Oriented	2.18	.874
9 (Tie)	Positive Expectations	2.18	.751
9 (Tie)	Creativity	2.18	.874
13 (Tie)	Strategic Influence	2.09	.931
13 (Tie)	Critical Inquiry	2.09	.831
13 (Tie)	Focus on Excellence	2.09	.944
13 (Tie)	Professionalism	2.09	.831
17 (Tie)	Proactive Info Gathering	2.00	.775
17 (Tie)	Systematic Thinking	2.00	.894
17 (Tie)	Interpersonal Sensitivity	2.00	.775
20	Interpersonal Assessment	1.81	.603
21 (Tie)	Optimizing	1.63	.674
21 (Tie)	Attention to Detail	1.63	.674
23 (Tie)	Assertiveness	1.54	.820
23 (Tie)	Collaborative Influence	1.54	.688
25	Efficiency Orientation	1.36	.505
26	Competitiveness	1.27	.647
27	Directive Influence	1.09	.301

Source: McVeigh, 1994.

NPS-94 DEVELOPMENTAL AREA ANALYSIS

Rank Order	*Program Managers (N=25)*	
	Job Competency	*% Rated Needs Training*
1	Political Awareness	60%
2	Critical Inquiry	40%
3	Long-term Perspective	36%
4 (Tie)	Innovativeness	36%
4 (Tie)	Managerial Orientation	32%
4 (Tie)	Strategic Influence	32%
4 (Tie)	Coaches Others	32%
4 (Tie)	Creativity	32%
9	Systematic Thinking	28%
10 (Tie)	Collaborative Influence	28%
10 (Tie)	Interpersonal Sensitivity	28%
12 (Tie)	Proactive Info Gathering	24%
12 (Tie)	Professionalism	24%
14	Interpersonal Assessment	20%
15 (Tie)	Optimizing	20%
15 (Tie)	Relationship Development	20%
16 (Tie)	Focus on Excellence	20%
16 (Tie)	Efficiency Orientation	16%
16 (Tie)	Action Oriented	12%
16 (Tie)	Results Oriented	8%
16 (Tie)	Sense of Ownership/Mission	8%
16 (Tie)	Self Control	8%
16 (Tie)	Attention to Detail	8%
16 (Tie)	Assertiveness	4%
16 (Tie)	Positive Expectations	4%
16 (Tie)	Directive Influence	0%
16 (Tie)	Competitiveness	0%

APPENDIX B. DEPARTMENT OF THE ARMY PROGRAM MANAGER OF THE YEAR AWARD NOMINATION FORMAT

Nomination Format
Secretary of the Army Award
For
Program/Project/Product Management

Name and Grade:
Title:
Program:

Assignment Date:

Nominating Official:

ASSIGNED RESPONSIBILITY: (Extract this information from the Significant Duties and Responsibilities section of DA Form 67-9-1. Although this area is not scored, the board members use this as a guideline in the scoring of other criteria.)

CRITERIA:

RESOURCE MANAGEMENT: (State achievements in both financial and manpower management.) MAXIMUM SCORE: 10

a. Financial Management.

b. Manpower Management.

ACQUISITION STREAMLINING AND INNOVATIONS: (Self-explanatory.) MAXIMUM SCORE: 10

PROGRAM COMPLEXITY: (State if program is comprised of basket programs; include multiple interfaces; include details on how the program affects the acquisition community, etc.) MAXIMUM SCORE: 10

EXCEEDING AGREED UPON PROGRAM OBJECTIVES: (Self-explanatory.) MAXIMUM SCORE: 10

(NOT TO EXCEED TWO SINGLE-SPACED TYPED PAGES)

APPENDIX C. PROGRAM MANAGER CHARACTERISTICS SURVEY

PROGRAM MANAGER CHARACTERISTICS SURVEY

PART I

- *The first page is the survey. Please follow the following steps:*

  1) In the first column, titled "**Most Important Characteristics**", select 9 characteristics (indicate by an "X") you think are most important to "OUTSTANDING" program managers.

  2) In the second column, titled "**Least Important Characteristics**", select 9 characteristics (indicate by an "X") you think are least important to "OUTSTANDING" program managers.

  3) In the third column, titled "Areas Needing Development", select 6 characteristics (indicate by an "X") you think additional education and training programs would benefit the greatest number of program managers.

- The second page contains definitions of the 27 program manager characteristics being analyzed. This is for your reference only. I recommend you print the definitions page for easy referencing.

- *Suggestion: Go through the list and make your initial selections. Count the number selected in each column. Then go back and eliminate or add to your initial selections.*

- *Please insure you have identified* **EXACTLY***: **9 "Most Important", 9 "Least Important," and 6 "Development" areas.***

- *Please read the instructions carefully before answering any questions.*

- **Please go to the next page and complete Part I.**

PROGRAM MANAGER CHARACTERISTIC SURVEY

CHARACTERISTICS*	*MOST* IMPORTANT CHARACTERISTIC *(select 9)*	*LEAST* IMPORTANT CHARACTERISTIC *(select 9)*	*AREAS* NEEDING DEVELOPMENT *(select 6)*
Action Oriented:			
Assertiveness:			
Attention to Detail:			
Coaches Others:			
Collaborative Influence:			
Competitiveness:			
Creativity:			
Critical Inquiry:			
Directive Influence:			
Efficiency Orientation:			
Focus on Excellence:			
Innovativeness:			
Interpersonal Assessment:			
Interpersonal Sensitivity:			
Long Term Perspective:			
Managerial Orientation:			
Optimizing:			
Political Awareness:			
Positive Expectations:			
Proactive Information Gathering:			
Professional Expertise:			
Relationship Development:			
Results Oriented:			
Self-Control:			
Sense of Ownership/ Mission:			
Strategic Influence:			
Systematic Thinking:			
TOTAL	9	9	6

* See definitions on following page.

Go To Part II

CHARACTERISTIC DEFINITIONS

- Action Oriented: Reacting to issues and problems energetically and with a sense of urgency.
- Assertiveness: Stating own position forcefully or aggressively in the face of opposition from others with influence.
- Attention to Detail: Carefully reviewing plans, reports, etc., to ensure that they are complete, accurate, and that they conform to standards.
- Coaches Others: Providing others with performance feedback and suggestions to improve their capabilities.
- Collaborative Influence: Modifying position to obtain the agreement and support of others in order to accomplish a shared goal or mission.
- Competitiveness: Being energized by any direct or indirect challenge to own or work group's performance.
- Creativity: Thinking up novel or unique ways to solve technical or administrative problems that others have difficulty solving.
- Critical Inquiry: Exploring critical issues that are not explicitly addressed or recognized by others.
- Directive Influence: Exercising full range of authority to gain the agreement or compliance of others.
- Efficiency Orientation: Continuously looking for ways to cut cost and complete even routine tasks more quickly.
- Focus on Excellence: Striving to achieve the highest standards regardless of circumstances.
- Innovativeness: Championing or initiating new ways of meeting program requirements.
- Interpersonal Assessment: Identifying the specific abilities, interests, motivations, characteristics, or styles of others.
- Interpersonal Sensitivity: Accurately identifying the spoken or unspoken feelings of others and acting accordingly.
- Long Term Perspective: Taking the time needed to think through future issues and problems.
- Managerial Orientation: Seeing ones own role as getting work done through the efforts of others.
- Optimizing: Making decisions after carefully evaluating the advantages and disadvantages.
- Political Awareness: Understanding who the influential players are, what they want, and how to best work with them.
- Positive Expectations: Assumes that others will perform effectively if given the opportunity and the needed resources.
- Proactive Information Gathering: Systematically collecting new and reviewing existing information to determine the appropriate decision or course of action.
- Professional Expertise: Seeing self or being seen by others as a technical expert in one or more acquisition specialty areas.
- Relationship Development: Spending time and energy getting to know program sponsors, contractors, or other influential people.
- Results Oriented: Evaluating own and other's performance in terms of accomplishing specific goals or meeting specific standards.
- Self-Control: Remaining calm and unemotional in stressful situations.

- Sense of Ownership/Mission: Seeing self as the one responsible for the overall success of the program; articulates problems or issues from a broader organizational or mission perspective.
- Strategic Influence: Building coalitions with influential others and orchestrating situations to overcome obstacles and obtain support.
- Systematic Thinking: Taking planned methodical approaches to organizing work and solving problems.

PART II

Please provide the following background information. It will be used to analyze the aggregate information obtained in Part I of this survey.

1) Current military status:

Active Duty	
Retired	

(If retired, skip to Section #3)

2) ***ACTIVE DUTY*** ARMY ACQUISITION OFFICERS ONLY:

a) What is your current Rank?

Major General (O-8)	
Brigadier General (O-7)	
Colonel (O-6)	
Lieutenant Colonel (O-5)	

b) Current Organization:

Program Executive Office	
Project Office	
Product Office	
Other:	

c) Current Position:

Program Executive Officer	
Project Manager	
Product Manager	
Other:	

d) Go to Section #4

3) ***RETIRED*** ARMY ACQUISITION OFFICERS ONLY:

a) At what Rank did you retire?

Major General (O-8)	
Brigadier General (O-7)	
Colonel (O-6)	
Lieutenant Colonel (O-5)	

b) Within which type Organization was your final acquisition assignment?

Program Executive Office	
Project Office	
Product Office	
Other:	

c) What was your final acquisition Position?

Program Executive Officer	
Project Manager	
Product Manager	
Other:	

d) Continue to Section #4.

4) Positions you have held including current(active) / final (retired); check all applicable; round to whole year:

POSITION	YES	# of YEARS
Program Executive Officer		
Deputy Program Executive Officer		
Project Manager		
Project Manager Staff		
Product Manager		
Product Manager Staff		
Test and Evaluation		
Training with Industry		
New Equipment Fielding Officer		
Force Development Officer		
Combat Development Officer		
Research Laboratory		
Army / OSD Staff		
"User" (Operational)		
Other (please specify):		

5) Formal Education Background (check all appropriate responses):

Discipline	**Bachelor Degree** (or Equivalent)	**Graduate Degree** (or Equivalent)	**Doctorate Degree** (or Equivalent)
Engineering			
Physical Sciences or Mathematics			
Biological Sciences			
Computer Sciences			
Business, Economics, or Management			
Liberal Arts			
Other (please specify):			

6) Acquisition Management Courses completed (40+ hours in length) completed; (check ***all*** that apply):

YES	**SPONSOR**	**COURSE #**	**COURSE TITLE**
	DSMC	ACQ101	Fundamentals of Systems Acquisition Course (FSAMC), (8 days)
	DSMC	ACQ201	Intermediate Systems Acquisition Course (ISAC), (14 days)
	ALMC		Material Acquisition Management (MAM) Course, (4 weeks)
	DSMC		Program Management Course (PMC), Part I (6 weeks) (no longer offered by DSMC)
	DSMC	PMT302	Advanced Program Management Course (APMC), (14 weeks) (formerly Program Management Course (PMC), (20 weeks)
	DSMC	PMT303	Executive Program Managers Course (EPMC), (4 weeks)
	DSMC	PMT305	Program Managers Skills Course (PMSC), (2 weeks) (formerly Program Managers Survival Course)
	DSMC	DSMC-30	Executive Management Course (EMC), (3 weeks)
	DSMC	DSMC-1	System Acquisition Management Course (SAMC), (1 week)
	DSMC	DSMC-2	Executive Refresher Course (ERC), (2 weeks)
			Other:
			Other:

7) Please identify what Acquisiton Category (ACAT) your current/final program is/was (check one):

Category	Yes
ACAT-I/D	
ACAT-I/C	
ACAT-II	
ACAT-III	
ACAT-IV	

8) Please identify in which phase your current/final program is/was (check one):

Yes	Phase
	Concept Exploration (CE)
	Program Definition & Risk Reduction (PDRR)
	Engineering & Manufacturing Development (EMD)
	Production, Fielding/Deployment & Operational Support (PFDOS)
	Demilitarization & Disposal
	Other (please specify):

9) What do you view as ***the MOST important personal characteristic*** for your success as a program manager? Why?

10) Are there any other personal characteristics ***not listed*** in this survey that you would consider critical to being an outstanding Army program manager?

11) What educational experience best prepared you for becoming a program manager? How did this experience prepare you?

12) What job best prepared you for becoming a program manager? How did this job experience prepare you?

13) What could you have done to be better prepared for becoming a program manager?

14) REMARKS: Please add any remarks that might improve this study or provide additional insight for future program managers:

15) Please list your name and e-mail address below to ensure accurate data processing. Your name will not be published in the research results.

NAME	E-MAIL

16) If questions, please contact me at: E-mail or Home telephone; or Naval Postgraduate School FAX: (DSN) 878-2138 / (COM) (831) 656-2138.

Again, thank you for taking the time to complete this survey and participating in this research which will benefit the Army Acquisition Corps.

Scott C. Armstrong
CPT, AD
Army Acquisition Corps
Naval Postgraduate School

APPENDIX D. INITIAL PROGRAM MANAGER CONTACT E-MAIL

Sir,

I am an Army Acquisition Corps, Air Defense officer, studying Systems Acquisition Management at the Naval Postgraduate School, Monterey, CA. For my thesis research I am seeking to identify the personal characteristics of outstanding Army program managers in today's acquisition environment.

To gather this information, I am surveying current and former Army program managers that were nominated for the Department of the Army, Program Manager of the Year Award, since 1994. From this elite group of PMs, including yourself, I will determine the key personal characteristics required to be an outstanding PM. The survey will take 10-15 minutes to complete and can be completed and returned to me electronically.

I have attempted several times to contact you by telephone, however, have been unable to reach you to discuss this with you personally. I know that your time is very valuable and have attempted to make your participation as simple as possible.

If you would be willing to participate in this research effort, please send a reply e-mail stating "YES." Upon receipt I will send you the survey file.

Thank you,

Scott C. Armstrong
CPT, AD
Army Acquisition Corps
Naval Postgraduate School

APPENDIX E. PROGRAM MANAGER INSTRUCTIONAL E-MAIL

Dear Sir,

I would like to thank you for agreeing to participate in my thesis research. As I mentioned, I am seeking to identify the personal characteristics of outstanding Army program managers in today's acquisition environment. To gather this information, I am surveying current and former Army program managers that were selected or nominated for the Department of the Army, Program Manager of the Year Award, since 1994.

Survey Overview:

- The information collected will provide the Acquisition Corps, educational institutions, and future program managers with current insight into the personal characteristics of outstanding program managers.

- Your responses will be kept confidential. Please be as candid as possible. A response based on your personal experience, rather than the "party line", will provide more beneficial results.

- There are two parts to the survey:

1. Part I: Addresses the characteristics of an outstanding program manager.
2. 2. Part II: Addresses your professional background.

- The "Program Manager Survey" is attached to this e-mail as a Microsoft Word document. Please download, open (in Microsoft Word), complete, save, and e-mail it back to me. Print page 3, the characteristic definitions, for your reference while completing the survey. Or, if you prefer, you may print the entire survey, complete it by hand, using X's to indicate your selection, and fax pages 2 and 4-8 back to me (ATTN: CPT SCOTT ARMSTRONG) at the Naval Postgraduate School FAX: (DSN) 878-2138 / (COM) _____.

- If you have any trouble opening the survey document, please let me know so I may fax you a copy.

- Upon faxing or mailing, please send me e-mail so I can expect your survey. Please retain your copy of the completed survey until I acknowledge receipt.

- If questions please contact me at E-mail: Home telephone _____.

- If possible, please complete and return this survey by 4 January 1999.

Thank you for taking the time to complete this survey and participating in this research.

Scott C. Armstrong
CPT, AD
Army Acquisition Corps

Naval Postgraduate School

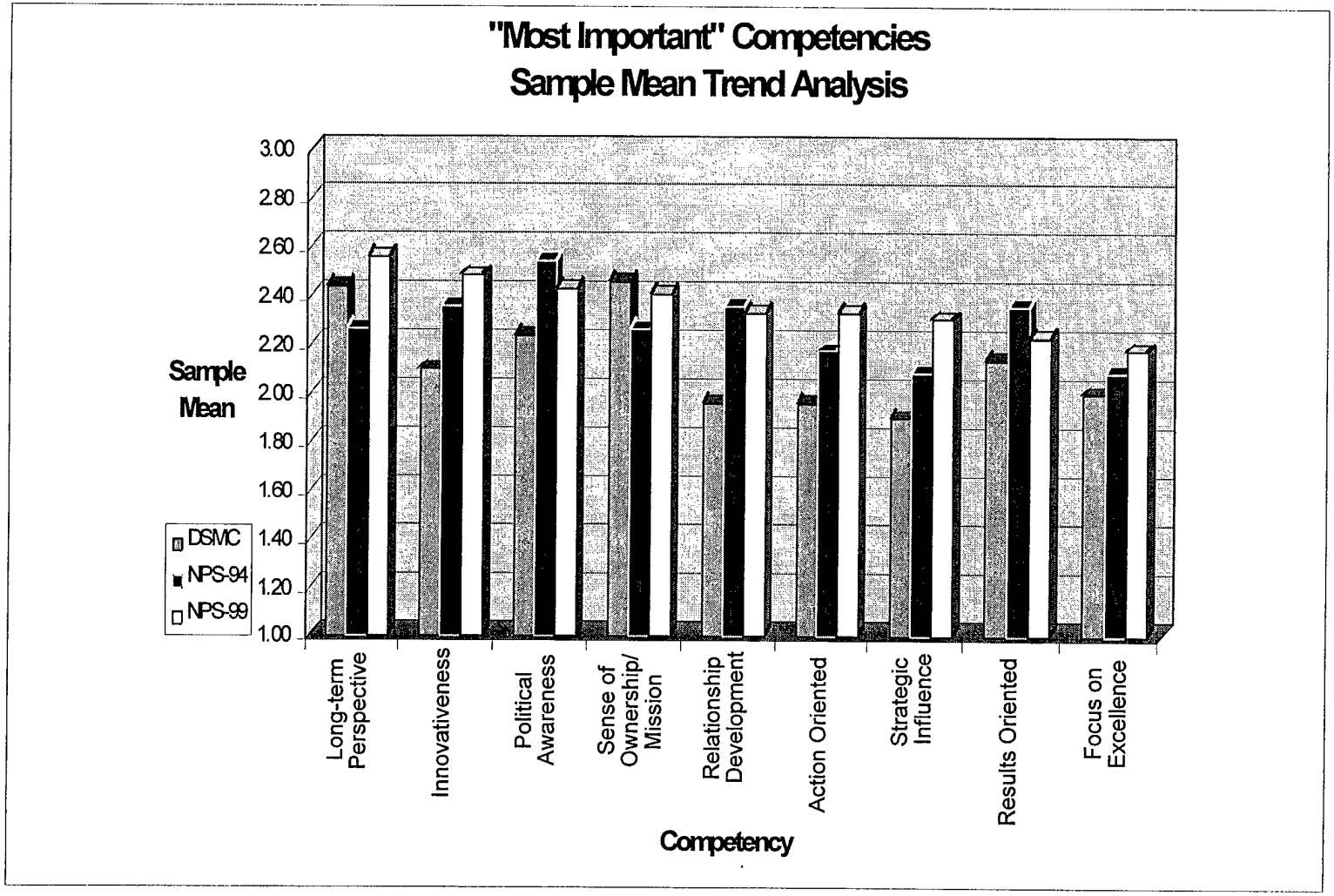
APPENDIX F: COMPETENCY CONFIDENCE INTERVAL CALCULATIONS

CONFIDENCE INTERVALCALCULATIONS

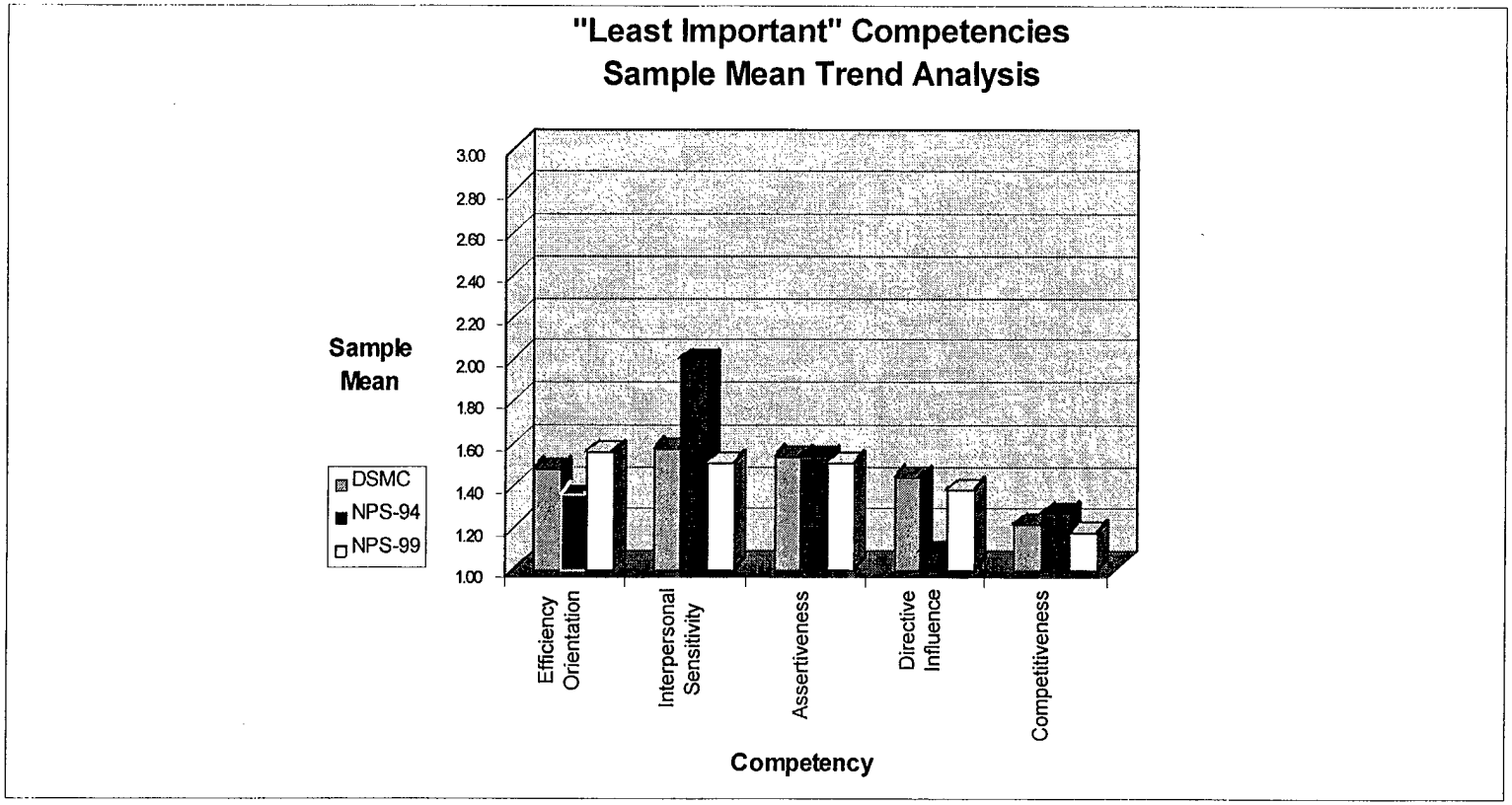
COMPETENCY	LONG	INNOV	POLITIC	SENSE	ACTION	RELAT	STRAT	RESULT	FOCUS	COLLAB	PROFES	COACH	CREAT	SYSTEM
n	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Mean	**2.564**	**2.487**	**2.436**	**2.410**	**2.333**	**2.333**	**2.308**	**2.231**	**2.179**	**2.154**	**2.154**	**2.103**	**2.103**	**2.077**
S (sample sdt dev)	**0.718**	**0.721**	**0.680**	**0.818**	**0.898**	**0.701**	**0.863**	**0.810**	**0.683**	**0.844**	**0.812**	**0.718**	**0.754**	**0.703**
Confid Level	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Sample Variance	0.516	0.520	0.463	0.669	0.807	0.491	0.745	0.656	0.467	0.713	0.660	0.516	0.568	0.494
Kurtosis	0.413	-0.206	-0.428	-0.862	-1.380	-0.755	-1.344	-1.319	-0.775	-1.539	-1.417	-0.978	-1.177	-0.884
Skewness	-1.360	-1.064	-0.813	-0.912	-0.731	-0.573	-0.659	-0.456	-0.242	-0.306	-0.296	-0.155	-0.174	-0.108
Std Error	0.115	0.115	0.109	0.131	0.144	0.112	0.138	0.130	0.109	0.135	0.130	0.115	0.121	0.113
df	38	38	38	38	38	38	38	38	38	38	38	38	38	38
t	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712
CI Full-width	0.624	0.626	0.591	0.710	0.780	0.609	0.750	0.703	0.593	0.733	0.705	0.624	0.655	0.610
CI Half-width	0.312	0.313	0.295	0.355	0.390	0.304	0.375	0.352	0.297	0.367	0.353	0.312	0.327	0.305
Lower Limit	2.252	2.174	2.140	2.055	1.943	2.029	1.933	1.879	1.883	1.787	1.801	1.791	1.775	1.772
Upper Limit	2.876	2.800	2.731	2.765	2.723	2.638	2.682	2.582	2.476	2.520	2.507	2.414	2.430	2.382

COMPETENCY	CRIT	MANAG	INT ASS	POSIT	PROACT	OPTIM	SELF-C	ATTENT	EFFIC	ASSERT	INT SEN	DIRECT	COMPET
n	39	39	39	39	39	39	39	39	39	39	39	39	39
Mean	**2.051**	**2.026**	**1.872**	**1.846**	**1.842**	**1.821**	**1.821**	**1.718**	**1.564**	**1.513**	**1.513**	**1.385**	**1.179**
S (sample sdt dev)	**0.793**	**0.778**	**0.732**	**0.745**	**0.754**	**0.790**	**0.683**	**0.857**	**0.598**	**0.756**	**0.644**	**0.711**	**0.451**
Confid Level	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Sample Variance	0.629	0.605	0.536	0.555	0.555	0.625	0.467	0.734	0.358	0.572	0.414	0.506	0.204
Kurtosis	-1.384	-1.314	-1.054	-1.112	-1.112	-1.304	-0.775	-1.385	-0.583	-0.284	-0.203	1.008	6.608
Skewness	-0.094	-0.045	0.206	0.260	0.260	0.338	0.242	0.594	0.519	1.108	0.886	1.587	2.595
Std Error	0.127	0.125	0.117	0.119	0.121	0.127	0.109	0.137	0.096	0.121	0.103	0.114	0.072
df	38	38	38	38	38	38	38	38	38	38	38	38	38
t	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712	2.712
CI Full-width	0.689	0.675	0.636	0.647	0.655	0.686	0.593	0.744	0.519	0.657	0.559	0.618	0.392
CI Half-width	0.344	0.338	0.318	0.323	0.328	0.343	0.297	0.372	0.260	0.328	0.279	0.309	0.196
Lower Limit	1.707	1.688	1.554	1.523	1.515	1.477	1.524	1.346	1.304	1.184	1.233	1.076	0.983
Upper Limit	2.396	2.363	2.190	2.170	2.170	2.164	2.117	2.090	1.824	1.841	1.792	1.693	1.375

APPENDIX G. COMPETENCY MEAN TREND ANALYSIS


"Most Important" Competencies
Sample Mean Trend Analysis
Sample Mean
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
DSMC
NPS-94
NPS-99
Long-term Perspective
Innovativeness
Political Awareness
Sense of Ownership/ Mission
Relationship Development
Action Oriented
Strategic Influence
Results Oriented
Focus on Excellence
Competency

"Average Importance" Competencies
Sample Mean Trend Analysis
Sample Mean
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
DSMC
NPS-94
NPS-99
Collaborative Influence
Professional Expertise
Coaches Others
Creativity
Systematic Thinking
Critical Inquiry
Managerial Orientation
Interpersonal Assessment
Proactive Info Gathering
Positive Expectations
Optimizing
Self Control
Attention to Detail
Competency


"Least Important" Competencies
Sample Mean Trend Analysis
Sample Mean
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
DSMC
NPS-94
NPS-99
Efficiency Orientation
Interpersonal Sensitivity
Assertiveness
Directive Influence
Competitiveness
Competency

APPENDIX H. COMPETENCY DEVELOPMENT AREA TREND ANALYSIS

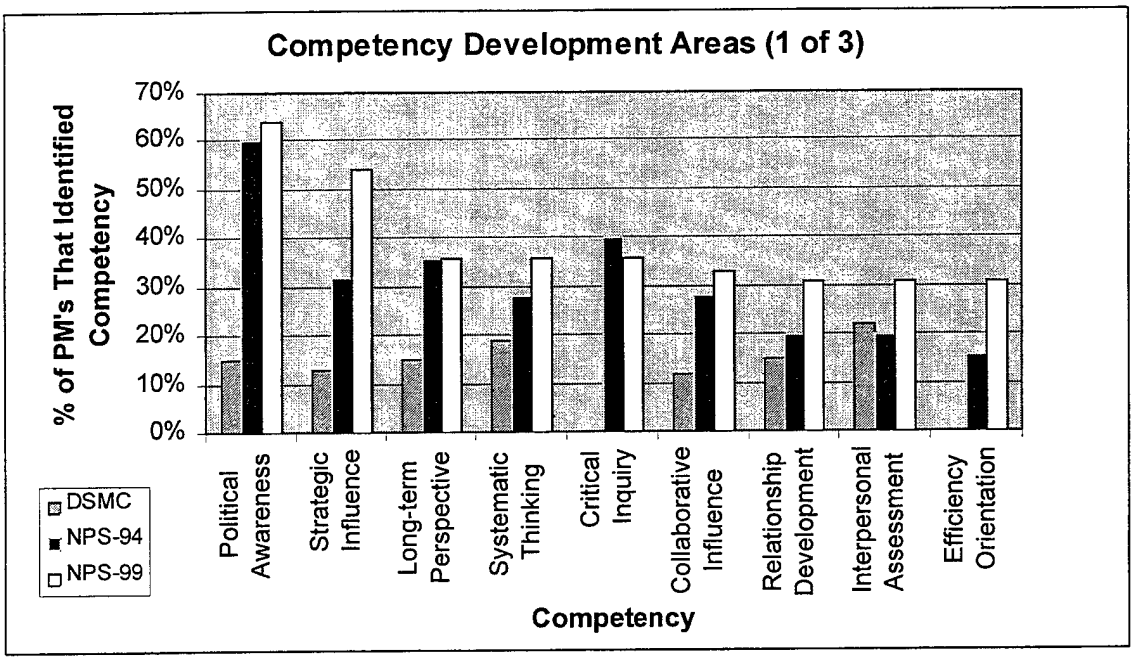


Figure 1. Competency Development Areas (Slide 1 of 3)

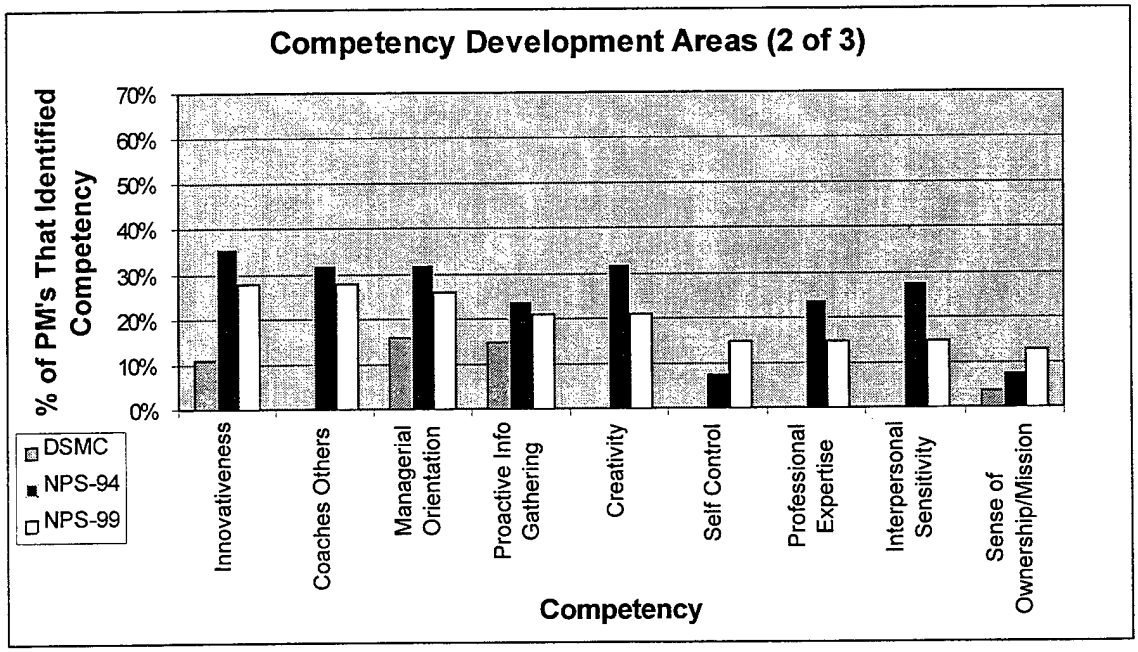


Figure 2. Competency Development Areas (Slide 2 of 3)

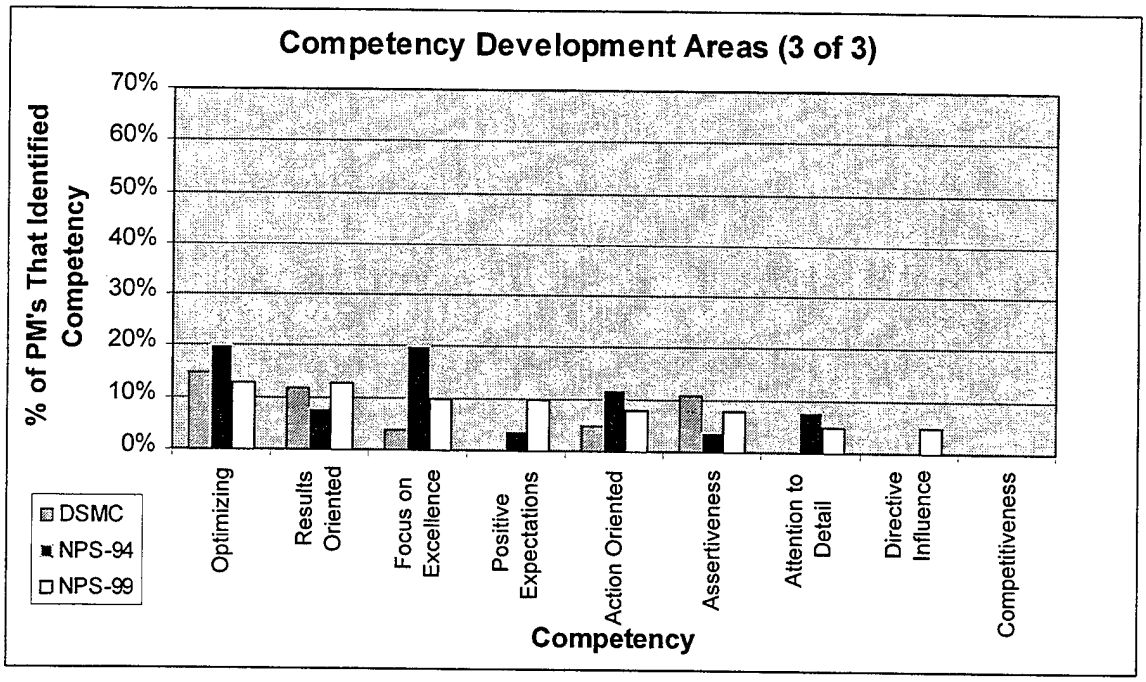


Figure 3. Competency Development Areas (Slide 3 of 3)

LIST OF REFERENCES

Archibald, R., *Managing High-Technology Programs and Projects*, John Wiley and Sons, Inc., New York, NY, 1992.

Boyatzis, R., *The Competent Manager*, John Wiley and Sons, Inc., New York, NY, 1982.

Cleland, D., and King, W., *Project Management Handbook*, Van Nostrand Reinhold, Inc., New York, NY, 1988.

Gadeken, O., "The Right Stuff: Results of the DSMC's Program Manager Competency Study, " *Program Manager*, September–October 1989.

Gadeken, O., "Project Managers as Leaders: Competencies of Top Performers," *Army RD&A*, January-February 1997.

Hall, M., "Changing the Way We Assess Leadership," *Acquisition Review Quarterly*, Fall 1997.

Jones, W., Jr., *From Packard to Perry, A Quarter Century of Service to the Defense Acquisition Community*, Defense Systems Management College, Ft. Belvior, VA, 1996.

Kerzner, H., *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, Van Nostrad Reinhold, Inc., New York, NY, 1992.

Leventhal, H., *Project Management in the Army Materiel Command*, 1962-1987, U.S. Army Materiel Command, Alexandria, VA, 1992.

Mansfield, A., "Naval Postgraduate School", *Project Manager*, September-October 1997.

Project Management Institute Standards Committee, *A Guide to the Project Management Body of Knowledge*, Project Management Institute, Upper Darby, PA, 1996.

Public Law 101-510, *Defense Acquisition Workforce Improvement Act*, 5 November 1990.

Sammet, Jr., G., and Green, D., *Defense Acquisition Management*, Florida Atlantic University Press, Boca Raton, FL, 1990.

Schmoll, J. H., *Introduction to Defense Acquisition Management, Defense Systems Management,* College Press, Fort Belvior, VA, June 1996.

Toney, F., "The Quest to Find the Superior Project Manager," *PM Network*, July 1998.

V-22 IPT Government Participation Concept of Operations, PMA-275 Interoffice Memorandum, 2 July 1993.

BIBLIOGRAPHY

Best, G. and Kobylarz, K., *Establishing a Department of Defense Program Management Body of Knowledge*, Master's Thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH, 1991.

Cullen, B., and Gadeken, O., *A Competency Model of Program Managers in the DoD Acquisition Process*, Defense Systems Management College, Fort Belvoir, VA, 1990.

Department of Defense Acquisition Reform Acceleration Day, "Acquisition Reform Legislation," Executive Summary, 31 May 1996.

Klemp, Jr., George O., *Job Competence Assessment: Defining "Success Factors" of Job Performance*, Charles River Consulting, 1979.

The American Heritage Dictionary, Second College Edition, Houghton Mifflin Company, Boston, MA, 1982.

"Discussion of the Defense Acquisition Workforce Improvement Act," Internet address: http://www.dtic.mil/acqed2/legislation/dawiadis.html#1, 1999).

"FY-1996 Defense Authorization Act Hailed As Victory For Acquisition Reform," DOD Press Release, Internet address: http://www.dtic.dla.mil/defenselink/, 1999.

Gadeken, O., "Competencies of Project Managers in The MOD Procurement Executive," Royal Military College of Science (Cranfield), Shrivenham, England, 1991.

Levine, D., Berenson, M., Stephan, D., *Statistics for Managers Using Microsoft® Excel*, Prentice Hall, Upper Saddle River, NJ, 1997.

McVeigh, B., *Army Program Managers: A Competency Perspective*, Master's Thesis, Naval Postgraduate School, Monterey, CA, 1994.

"Memorandum For The Defense Acquisition Community, Update of the DOD 5000 Documents, Executive Summary," March 15, 1996

"MN3301 Course Lecture Slides," Naval Postgraduate School, Monterey, CA, 1997.

"PMT 302 Course Lecture Slides," Defense Systems Management College, Fort Belvoir, VA, 1998.

Morton, K., Office of the Secretary of The Army for Research, Development and Acquisition, Telephone Interview, 21October 1998.

V-22 IPT Government Participation Concept of Operations, PMA-275 Interoffice Memorandum, 2 July 1993.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center 2
   8725 John J. Kingman Road, Suite 0944
   Fort Belvoir, VA 22060-6218

2. Dudley Knox Library 2
   Naval Postgraduate School
   411 Dyer Road
   Monterey, CA 93943-5101

3. Prof. Lee Edwards (Code SM/Ed) 1
   Naval Postgraduate School
   Monterey, CA 93943-5103

4. Prof. Michael Boudreau (Code Sm/Be) 1
   Naval Postgraduate School
   Monterey, CA 93943-5103

5. Prof. David V. Lamm (Code SM/Lt) 3
   Naval Postgraduate School
   Monterey, CA 93943-5103

6. Dr. Owen C.Gadeken 1
   Professor of Engineering Management
   Defense Systems Management College
   Attn: FD-PML
   9820 Belvoir Road
   Ft. Belvoir, VA 22060-5565

7. Office of the Principal Deputy to the Under Secretary of Defense for Acquisition and Technology 1
   ATTN: COL Hamilton, SMA
   3015 Defense Pentagon
   Washington, DC 20301-3015

8. Assistant Secretary of the Army (ALT) 1
   RM 2E672
   103 Army Pentagon
   Washington, DC 20301-0103

9. LTC (Ret) and Mrs. Armstrong 1
11338 Cloudcrest Drive
San Diego, CA 92127

10. Captain Scott C. Armstrong, USA 2
514 Elsie Drive
Newport News, VA 23608-1100